

A List of Chapmen's BOOKS.

Accomplished Gentleman	Irish Rogues
Arabian Nights	History of Ireland
Art's Matter-piece, or	Life of Christ
Companion for the In-	Fortunate and Unfortu-
genious	nate Lovers
History of Amer	and jests
Anson's Voyage	
Top's Tab	
Ascanius	
Argalus and Parthenia	
Academy of Compliments	Discourse
Battle of Aughrim	Pilgrim's Progress
Book of Knowledge	Persian Tales
Don Bellianis	Pirates
Capt. Cook's Voyage	Parisinus and Parismenos
Children's Bible	St. Patrick
Child's Friend	Don Quixote
Chinese Tales	Royal Nov. & Roy. Slave
Cynthia	Reynard the Fox
Robinson Crusoe	Modern Story-Teller
Seven Champions	Secretary's Guide
Death of Abel	Shore and Rosamond
Sir Francis Drake	Think well on't
Qu. Elizabeth and Earl	Destruction of Troy
of Essex	Two Journeys to Jerusalem
History of England	Tales of Fairies
Royal Fairy Tales	Valentine and Orson
M. Goose's Fairy Tales	Vicar of Wakefield
Fortunatus	Seven Wise Masters and
Female Worthies	Mistresses
Ereney's Life	Winter evening tales
Fair Moralist	Nine Worthies
Gesta Romanorum	Guy of Warwick
Garden of Love	Humphry Wildman
Geography of Youth	Youth's Divine Pastime
Gulliver's Travels	Youth's Instructor
Hocus Pocus	



Reader, Whoe'er thou art that this dost buy,
 And art reloly'd *Ingenious Arts* to try,
 Here thou wilt find a *magazine of Wit*,
 The like, (I'm sure) was never printed yet.

ART'S
MASTER-PIECES

COMPANION

FOR THE

INGENIOUS of either SEX.

IN TWO PARTS.

I. The Art of Limning and Painting in Oil, &c.

II The Art of making Glafs of Cryſtal of all Sorts and Colours.

And other Matters worthy of Note.

To which are added,
Many Curioſities, and rare Secrets,
known to few, but very profitable and pleaſant.

The Ninth Edition, by C. K.

Dublin: Printed by R. Jackson, Meath-ſtreet,
1792.

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Concerning the Loadstone.

THE
Curious ART
OF
DRAWING,
AND

Preparing for *Limning*, and *Painting*
in OIL, &c.

The *Introduction* to the *Practice*, in some Things necessary to be provided, for the proceeding in this ART.

THE curious Art of *Limning*, or *Painting* in oil, has in all ages been wonderfully admir'd and approv'd, as the master-piece of other arts and sciences, wherein art so exactly imitates nature; that motion only seems to be wanting; and many such rare pieces have been drawn, that they have at the first blush, deceived the eyes of the curious, who have taken them for real living beings; and tho' the eye and hand are mainly required herein, the one to direct and the other to operate, yet the mind or imagination must furnish out a great part of the curiosity, having ideas of the true shape of things always in a readiness.

This cannot be done hastily, but must be done by a steady practice and curious observation; the first thing in this undertaking, is to furnish yourself with suitable materials, and amongst others,

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French chalk red and white, that it may be cut into curious taper pencils, to draw the out-strokes of any figure you design; Sallow-wood so burnt that you may do the like by it, and if these strokes hit not at first to due proportion, they may be rubb'd out with the feather of a Mallard's wing, and so till you find them right; then go over your strokes with a strong well pointed pencil, either of red or black lead. To make the impression more even and regular, it will be proper to have pens made of Raven or Crow quills, to finish the finer strokes, also a rule and compass with three feet, to take in and out at the points, as you have occasion, the one of white or red chalk, the other of black lead, and a third of any other pastil, and these in most drawings are proper to mark out equal distances after the drawing of the out-strokes. There are other things required, which in their proper places I shall speak of.

Being thus far entered, come a little nearer to the practice, and make your entrance on it with plain geometrical figures, such as are the circle, square, oval, cone, triangle, cylinder, which at first use yourself to mark out with your rule and compass, till you can readily do it with your hand, and these will much assist you in the beginning of this curious undertaking: The circle well made, will direct you in orbicular forms, as the globe of the Earth, Spherical World, Moon, Sun and the like, is very proper in confining the picture you are to copy; the oval gives you directions for the mouth and face, the foot of a wine-glass, the mouth of a well, and the like; The cone assists in drawing columns, spires, tops of towers, steeples, &c. The triangle is of admirable

able use in making the half face, the cylinder gives you assistance in drawing columns, pillars, pilasters, and other things belonging to architecture; the polygon may be also used for ground plats, fortifications, &c. and angles and arches in perspective.

These things premised, try to draw several sorts of fruits and flowers, as grapes, cherries, peaches, apples, apricots, tulips, pinks, &c. also insects, trees, branches and the like, and from these proceed to practise on birds, beasts, &c.: Consider well their proportion, colour, slowness, swiftness, fierceness and many other things natural to them. And the better at first, till your mind can well frame such ideas, it will be proper to have good drawings to imitate, and so go on by degrees, and other things, as fish, melons, roots, oranges, &c. and by no means mistake, their suitable lively colours, nor proper form, and then you may venture on human faces and bodies, wherein lies the excellency of this art.

Of Drawing Faces, &c.

When you come to draw a face, you must well weigh and consider in what posture it must be done, whether sideways, upward, forward or downward, touching lightly the features, where the nose, eyes, mouth, and chin ought to stand, then go more perfectly over them, for the circles, squares, and triangles used in this matter, may sufficiently guide you where the nose, eyes, mouth and chin should stand; but in taking the features, observe with a stedfast eye the principal muscles in the face, which in persons of years appear very much; and there is usually to be observed a three fold proportion in a face, as in the

first place, from the top of the forehead to the eyebrows; in the second place, from thence to the bottom of the nose; and lastly, from thence to the bottom of the chin; observing in this case a due proportion in the length of the forehead and nose.

In a full face, the distance between the eyebrows consists of the length of one eye, but where there is a side, or three quarter face, the distance must be lessened, answerable to the proportion, the nostrils must be placed directly against the nether corner of the eyes, and if the face you draw be plump or fat the cheeks must swell; but consider in a lean face, the jaw-bones stick out, and the cheeks fall somewhat in.

In a smiling countenance, the corners of the mouth turn some what upwards and in a sour frowning countenance, the forehead is bending, and wrinkles appear on the upper part of the nose.

In drawing a fore right face, you must make a perfect oval, divided by two lines, into three equal proportions; in the first part place the eyes, in the second the nostrils, and in the third the mouth, keeping the eyes an equal distance from each other.

In drawing an upright head, you must make it in equal divisions, with three lines every way, either upwards, downwards, higher, or lower, divided as the former.

To draw the shortened or inclining face, observe how the lines agree, and so in their proper places you may draw the mouth and nose, and the rest of the parts after you have brought your hand a little into practice; and note, whatsoever proportion the face bears, your out-strokes must be formed accordingly.

As

As for the nose, you must, among, other things, particularly observe the roundness, hollowness, and indentings of the nostrils.

As for the hands, their postures are various, but a true measure must be observed in it, according to the proportion you draw; as likewise the arms, as far as they appear bare, then proceed to draw the feet with measure, and without, but for these it will be requisite to get drawings to practise on at first, then practise drawing feet and legs, conjunct or separate, and proceeding from the members, draw the other parts of the body, and practise first on a child, wherein there is more ease, because they are of a fatter and plumper face and body, the sinews, lines and muscles, not appearing as in men and women.

In drawing, begin at the head, and so proceed by degrees to the feet, running it lightly over at the first, and as you see occasion, encrease the fullness: Let the parallel joints and sinews be equally proportioned, as also the muscles, and their attendants, and exactly opposite, and the motions of the body be answerable to each other, and the limbs a true symmetry, one not being larger than the other, nor longer where nature requires it not.

In shadowing, observe to cast them ever one way, as in the figure of a woman, if you begin the shadow at the left cheek, you must continue the like on the left side of the neck, body, and all other parts, unless the light side of it requires to be dark, by reason some other body standing between the light and it, as put the case three men stand together, the middle figure must be darkened by the foremost, unless the light by facing it comes between them.

Observe

Observe that all shadows, the further off they are, grow fainter; and circular bodies must have a circular shadow, according to the light that makes it.

In drawing a figure standing, draw that leg the body stands firm upon, strait and steady, or else the figure will seem to decline, as if it were falling.

As in naked figures, the out-lines are required to be drawn first, so do it in drapery or cloathing, leaving spaces within for your greater or lesser folds, and break them into lesser that may be contained within them, and the closer the garment sits to the body, the smaller and narrower must be the folds, and in shadowing the innermost it must be the harder, and the outermost the softer, continue the great folds, but as for the lesser, break them off where occasion requires it; and the finer the drapery is, the finer and sharper must the fold be, and the shadow the stronger and finer to the eye, always observing, that the garment that sits close, as the body-coat of a man, or breasts, of a woman, and the like, represent that part of the body, that the garment appears to cover, as womens breasts, with a sweet round shadow, and the like.

Of Colours useful in Limning, or Painting, and other Matters.

The next thing to be considered, the cloth primed, and the drawing put on, is the preparing your colours, which in oil-painting must be with linseed oil, unless for linen, and then walnut is a great deal better, for it will not turn yellow as the other in time will, when mixed with curious white.

You

You must grind your colours on a stone with a muller, till they are as fine as butter, &c. The colours proper to be used in Limning, are

The blacks; sea-coal-black, ivory-black, lamp-black, and earth of collen; the white, white-lead; the green, terravel verditer, and verdigrease; the yellow, spruce oaker, pink or piment, and masticot; the blues, smalt, bis, indigo, and ultramarine; the reds, red-lead, vermilion lake, indian red, carmine, and ornatio; the colours indifferent, are, umber, spanish brown, burnt spruce.

These are the chief to be laid in oil, but ivory, spruce oaker, and umber, must be burnt before they are ground; and as for masticot, ultramarine, vermilion, smalt, and orpiment, you may temper them on your pallet without grinding, tho' grinding is better, because it mixes them the better with the oil, and makes them dilate and spread more easily; And what of these are to be burnt, perform it in a crucible, taking care they be not over burnt, to lose their tincture.

Take care in the next place to get some good pencils of all sizes, proportionable to your work, a pallet or board to lay colours on whilst you are using them, an easle to place your cloth upon, or against, and a straining frame, to which it must be nailed, a mull-stick or stay, made of brazil, or some ponderous wood, not subject to bend, about a yard long, at one end tie a ball of ravel'd cotton, with a leather over it, so that with your left hand holding it against the work, you may support your right arm with it, whilst you are working.

Of Mixing or Tempering of Colours.

To make a violet-colour, take indigo, white-

lead and lake, mix them well, and the more or less quantity of each will make it deeper or lighter.

A lead-colour, make of white and indigo, well mixed and tempered together.

For a scarlet-colour, take lake, red lead, and a small quantity of vermillion.

For a flame colour, take red lead, and masticot heightened with white.

For a light green, take pink and smalt, and as you see occasion, lighten it with white.

For a purple colour, take spanish brown, indigo, and white, well tempered together.

For a bay colour, mix spanish brown and white.

For a murrey-colour, mix lake and white; And so by often tempering colours, and practice, you may find out the rest.

Of the first Operation or Sitting.

Having thus far proceeded, it will be time to begin your work, and having laid your ground for the general complexion, and drawn the outlines, which you must do with lake and white mingled, drawing very faintly, that if there be any fault, it may be rubbed out, and amended; the proportion of the face drawn, add to the former colour a small proportion of red lead, tempering it faintly to the colour of the cheeks and lips, the tip of the chin and ears, about the eyes and roots of the hair, placing red shadows; and the shadows must not be put in with the flat of the pencil; but with small touches, after the manner of etching; and this wise go over the face, and cover the ground-work with these and the like shadows; but in the dead colours, your curiosity need not be great, only strive as near as you can to imitate nature, for the roughness of the colours may be mended at the second operation.

Having duly plac'd and proportioned your red shadows, proceed to put your faint blue shadows about the corners of the eyes and balls, &c. and the greyish blue under the eyes, and about the temples, working them sweetly and faintly over, by degrees, beginning the shadow as the light falls, as likewise the hard shadows on the dark side of the face, under the eye brows, chin, nose, and neck, with strong touches on those places, so pass to the light side of the face, and bring all your work together to an equal roundness; yet at this time give not perfection to any particular part, but well view the work, and consider how near you come to the life, not only in likeness, but posture, colouring, &c.

Having now wrought the faint shadows into the red shadows, you may take a touch at the hair, disposing it in such curls, folds, &c. as best contribute to grace and ornament, only drawing it with colours suitable to the life, and deepen it somewhat more strongly in the deepest shadowed places, and so desist from your first operation.

Of the second Sitting or operation.

The party to be drawn in this second sitting, must take the place and posture as before, and now you must take a more curious survey of the lines and features, and as you drew them over roughly before, now is the proper time to sweeten them with the same colours, by working and drawing them one into another, so that no rough edge, or lump of colour may appear; and you must do this with a pencil sharper than the former, to render the shadow smooth and soft.

This done, proceed to the back-side of your picture, and if there be a curtain required, and it
be

be suppos'd of blue sattin, then temper blue with your oil, and draw the out-lines of the curtain, as also your picture, and lay it over very thin and airy with a large pencil, that it may be the whole ground intended to be done with blue, and then lay it over again with a substantial body, with the same colour, doing it swiftly, that no part of the colour may dry before it be all finished. And in the same manner you may lay the back-side with any colour.

This done, lay your linen of a fair white, and your drapery flat, with the colour you intend it; then view the face again well, noting what shadows are too light or too deep, and labour to reduce the several shadows to their perfection, then draw the lines out of the eye-lids, and shadow the entrance into the ears, the deepness of the eye-brows, and all the most material marks and notes in the face; do this with a curious sharp pencil, then heighten the hair, deepening it as it appears in the life, casting over the ground some loose hairs, which will not only make it look airy, but seem as if the picture stood at a distance from the curtain.

In shadowing the lines which must be done curiously, use black, white, and a little blue, deepen the black with ivory-black, and put to it a little quantity of indigo or lake, and so the second operation is finished.

The third Sitting or Operation.

Herein where you find any defect, or judge it reasonable, you must give strong touches taking curious heed for the rounding of the face; which will now be better accomplished than before, observing diligently what yet may conduce to similitude,

itude, as moles, scars, casts with the eyes, drawing of the mouth, and the like.

For Garments or ornaments, the ground for blue being laid with bice, the deepening must be indigo and a little lake, the lightening white, very fine, faint and fair, and for the greater ornament, the light may be mixed with silver or gold, but of drapery more particularly in metzotinto painting; for pearl colour, the ground, must be white and indigo, and the shadow, pink and black; if the body requires to be in armour, let leaf silver be the ground, and when it is well dried and burnished, work the shadow, with silver, umber and indigo, and the shadow on the silver, as the life directs.

For gold armour, lay shell gold for the ground, or liquid gold, and shadow it with lake, English oaker, and a mixture of gold.

For Drawing a fair Complexion.

To do this, make a mixture of a small quantity of white, and twice as much lake and vermilion; temper them well with the flat of a knife upon the pallet, and let it be used as the deepest carnation in the face; then adding a little part more of white, reserve that for a lighter carnation, and yet a third part being reserved, add more of white to it till it comes to the lightest colour in the face, and so proceed to prepare the faint shadows.

In doing this, take smalt and mix it with a little white, which may conveniently serve for the eyes, then separate the greatest quantity, and add to the rest a little pink, and these well tempered will be sufficient for the greenish shadows in the face, then proceed to prepare your deep shadows;

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dows; do it with pink, ivory-black, and lake, - a like quantity of each, temper them well together, and if the complexion you draw, requires redder shadows, add more lake; if bluer or greyer, more black; if yellower more pink.

Having prepared your pallet with suitable colours for a fair face, consider again what other colours are required; if the complexion be more brown or swarthy, in such cases temper the colours as before, putting a little quantity of burnt oaker amongst the lake, and vermillion and white, that it may amongst other heightened colours appear tawney; and in this case temper so much oaker as will just turn it; and for your very deep, and very faint shadows, use the same as for the former complexion.

For a tawney complexion, use the same as before, however prepare the shadows of burnt oaker and umber.

For a very black or dark complexion, prepare the shadows as the foregoing, but as for your lightening, take lake, burnt oaker, with white and black, however but a little of the white must be put in at first, that by degrees it may be the better worked up, and observe that the single shadows laid at first upon your pallet, and well tempered according to the foregoing directions, serve as shadows for all complexions.

Further Directions for colouring Garments, &c.

These garments or drapery, require to be made suitable to their colours; for red therefore lay the ground with vermillion, glaze it over with lake, and heighten it with white.

For scarlet, let vermillion be the lightest, deepened with lake, and heightened with indian red.

For

For crimson velvet, lay a ground of burnt oaker, vermillion and indian red, glaze it with lake, and touch it up with vermillion.

For a sad red, heighten indian red with white, and deepen with black, pink and lake, well mixed together.

For green, heighten bice and pink with masticot, and deepen it with pink and indigo.

For green velvet, lay the dead colour with a little white and lamp black, glaze it with verdigrease, deepened with pink and indigo, and heighten with white and pink.

For yellow, use masticot, umber, and yellow oaker, lay the dead colour with masticot and white in the highest places, and with oaker in the meanest, in the darkest with umber, glazing when dry with pink.

For blue garments, take indigo and white, first laying the white in its due place, and then your mean colour, viz. indigo and white, well tempered in their proper place, then deepen with indigo, and when dry glaze it with ultramarine.

For black garments, let the dead colours be lamp black and a little verdigrease, and go over it when dry with a little ivory black, and when you have heightened it with white, go over the work with verdigrease and Ivory black.

For orange colour, mix lake and red lead, laying the lightest part with red lead and white lead, the mean part only with red lead, and the deeper with lake; and if it be necessary you may heighten with white.

For a cloth colour, let the ground be umber and white, and for the deeper shadows black and umber; for the mean, oaker and umber, and
heighten

heighten it with oaker and white. And so much for colouring garinents.

Instructions how to frame and paint Landships.

In this work of painting with oil, begin with the sky and sun beams, and the lighter parts, and then the yellow, which must be done with masticot and white; the next your blue sky, with smalt, leaving no part of the ground uncover'd, but lay the colours smooth all over, working the sky downwards towards the horrizon, still suffering it to go fainter as it inclines nearer to the earth, and work the tops of mountains and other objects very remote, so faint as they may appear lost in mist and air, and as for the nearest and lowest ground, it must be a dark brown earth-colour. inclining a little to yellowish and green, as the nature of it requires, the next a light green, and so proceed gradually; as they lose in their distance, you must lessen their colour, observing not to make any thing that is to be seen at a great distance perfect or really, because you must imagine it is at such a distance that you cannot well discern it; but express it in colours weakly and faintly, as your eye judges it may be, always taking notice to place the light opposite to the dark which will very much extend the prospect, and do it so that the shadows may lose in their proportion of distance, their force by little and little. as they remove from the eye, observing always to put in the strongest shadows nearest; put no moon nor stars but in a night piece, for they are not otherways naturally proper, because they cannot be well seen in the day; if you imitate an over-cast sky, where black clouds threaten a storm, the shadows may be on the meeting parts
of

of the clouds. This may be also done with colours mixed with water, wherein gum-arabick has been dissolved.

If in any fair landkip you express the light of the Sun, always observe throughout the whole piece, that you cast the lights of your trees, rocks, hills, building, ruins, and all other things expressed in that way; observe also to lessen your bodies proportionably as they are nearer or farther distant, and carry it off so far that the earth and sky, or water, seem to meet. Rivers as they run to a distance, must lessen their streams; so ships or boats, and the like.

As for living creatures beasts, fowls and serpents, or insects, you must consider their proportion, shape, and colour, and get draughts or patterns, which will better be than printed directions; and these kinds being numerous, for brevity sake. I must omit to treat of them.

To lay on Metxotinto Prints on Glass.

In undertaking this, curiously lay the prints flat-ways in warm water, of the finest and thinnest paper, for that which is rough and thick will not do near so well, if at all; let them soak well, and your glass being very white and thin, go over it with Venice turpentine spread thin, with a pliable knife, and dab it all over with your finger, that the turpentine may seem rough.

This done, take the soaked print, and lay it on a clean cloth smooth, then press it with another to take out the water, then lay it on a glass, the print next it, beginning at one end, stroaking outwards the part already fixed to the glass, that neither wind nor water may be retained between, to wrinkle it; then with a little sponge, or your hand,

hand, wet the back side, and lightly by degrees, roll off the paper carefully, without making holes, especially in the lights, which are the tenderest, and when the print appears very plain on the back side, let it dry about two hours, then varnish it over with turpentine or mastic varnish till you can see through it, and a night's drying will prepare it to be worked on with colours.

If you would have all the paper off, so that nothing but the print may remain, lay it as before, with oil of mastic and a little turpentine, and a brush will fetch off the paper.

To paint Landships of Metzotinto.

As for the posture to do any of this work, the best is sitting to a true light, your pencils must be fine, and in the first place glaze all the places that require, and if you would have them so thin as they should be, and soon dry, mix varnish as they are laid on, and in four hours you may venture other colours.

In this work glaze the nearest and greatest trees, ground them with brown pink, or if you fancy them greener, use distilled verdigrease, and where the leaves and weeds that appear in some landships very sprightly and extraordinary green, must be glazed with distilled verdigrease and Dutch pink, the trees appearing farther off, with only the former; the hills, rocks, mountains, and trees, at the greatest distance, glaze with smalt, a little lake, and verdigrease thinly mixed with varnish, as for the skies, use ultramarine or fine smalt, mixed with thin varnish, glaze it over two or three times with a large clean pencil, and nimble strokes: if buildings, or ruins of buildings appear in it, finish them first. And the
mixture

mixture of colours, for these consist of yellow, black, white, and now and then a tincture of red.

To finish ground, trees and skies, begin with the nearest and largest trees, do over the lightest leaves with white pink and a little smalt and neatly do over the darkest and nearest leaves with a little pencil dipped in varnish; and those trees you would have very beautiful, paint with a mixture of verdigrease, yellow masticot and white, the darker parts with white verdigrease and pink, as also those trees you glaze with verdigrease only, they being very light mixed with white.

As for the skies and foreskirts, if any clouds appear, let them be touched with varnish, and a light colour made of white lake and yellow oaker, touch also with these the light parts of hills, likewise towns, and the remotest distance; then mix white and smalt, as light as conveniently may be, and paint over the sky, add a tincture of lake for the dark clouds; let the colours lie even and thin, and when finished, give it time to dry, to make it look more lively, set the picture against the light that the shadows may appear.

Of painting Figures this way, as Men, Women, &c.

In painting a face, where there are deep shadows, glaze and touch them thinly with brown pink, lake and varnish, also the black ball, and white speck of the eye, as you will be directed by the print, the round white ball must likewise be of a convenient colour; if the lips are to be of a curious red, glaze them with lake or carmine, and then begin with the dark side of the face, and paint the shadows with the colour more red than usual; to do this yellow pink, vermilli-on and white are most proper; and note, no varnish must

must be used in painting flesh colours, except in glazing the shadows, for the varnish dries so fast, that you cannot sweeten the shadows of the flesh.

After this give a few touches on the strongest light of the face, as the forehead, top of the nose by the eyes, chin and mouth, which colour must be made white with pale masticot, or yellow oaker, and a little vermillion mixed, according to the complexion intended, then mix that colour a little darker, and lay it on all the face that before you had not very carefully painted; yet that for the mouth and cheeks must be somewhat redder.

Now with a fine clean pencil, that has been worn a little, hatch and sweeten the flesh colours and shadows sweetly together, taking care to cleanse your pencil as often as it is requisite, so that whilst the piece is moist and wet, you may regulate cheeks too pale, or any other defect.

If the complexion be swarthy, mix the flesh-colour with white, brown or yellow oaker, and light red, with agreeable shadows; and by this means you may paint naked breasts, bodies or hands, always being careful that your pencil be steadily guided, for the least slip mars the feature: and trespass not on features and lines of a disagreeing colour.

How to paint the Hair.

In this painting you have no occasion to use colours or varnish near so dark as the life, for the paint contributes to the darkening of it; as suppose you were to paint black hair, you mix black, red oaker with a touch of light red or lake, and these may well produce an ash colour, and the hair coloured with it will shew you a natural black; if you would make the curls stronger,

, with a lighter colour touch the lightest part, and the darkest with the contrary, which you may well see through, if the colours are not laid too thick.

Of painting Garments or Drapery.

If you are to paint cloth or drapery, in a broken colour, observe carefully its mixture; however you must make three degrees of that colour, one the proper colour, another more light, and the last darker, for it must be for the darkest folds, and the lightest for the lightest pleats, and that between both for the other parts.

With a worn pencil sweeten the colour, so that the folds may lie hard, and if you intend to make a fringe embroidery, or the like, add to them shell, or powdered gold or silver; mix your minerals with gum-water, having a fine pencil to hatch or embroider the flowers; and touch the hinges and other embroideries before you glaze, after this manner, viz. I imagine the changeable draperies ground to be purple, and the light yellow, then must I take a fine pencil dipped in varnish, and thinly touch all the lightest parts of the folds with yellow masticot, if there be occasion repeat it, for it must be granted the colour must be very thin with varnish.

When dry, I must glaze all over with lake, smalt or ultramarine, once or twice with varnish, and so it must dry; and then I mix three degrees of purple colour, of smalt, lake and white, and lay them on as directed; and by these measures fitting your colours suitable to your attention, you may paint any other coloured drapery, which in this little book I want room particularize.

The curious Art and Mystery of Japanning.

To be proficient in this art, several matters are required,, and these you must consider as suitable, not only in property, but goodness, that your cost and labour may not prove in vain.

Get two strainers made of flannel, moderately fine, or of coarse linen, in the nature of a tunnel, for to strain your lac varnish, and the other for your white varnish, and the first of these may serve for lackers, when your occasion requires you to make them; besides these there are required two tunnels of tin for the same purpose as before; glass bottles and vials small and great must be in a readiness to suit with the quantities of varnish your business requires you to use, and gally-pots to put it in when you design to work; as also to mix your blacks in, when they come to be ordered with other things.

As for tools they are no less requisite, for without them this art would be insignificant, and therefore to furnish yourself with them, you must have pencils according to the greatness or smallness of the thing intended to work on; those for the varnish must be made of camel's hair very soft, and are of various prices, as to the largeness or fineness; likewise drawing pencils placed in swallow, duck or goose quills, as the fineness or largeness of the stroke requires, and the longest haired pencils are accounted the best in this matter, to smooth the work before it is varnished, or take off the knobs or grittiness from the ground, or when it is varnished.

Tripoli is proper to polish this work with when varnished, being reduced into fine powder, and sifted; as for linen rags, you must be provided with

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with them, both fine and coarse, to clear and polish this work, also olive oil for a clearing; as many of these things shall be directed hereafter, as they occur in due place in the work,

*Several things necessary to be used in this Art, &c.
Of Spirit of Wine,*

This is of main use in varnishing, and if it be not properly qualified it will spoil the varnish, and not be capable for want of strength, to dissolve your gums, to make them spread, and so consequently lie uneven upon the work; and to know when this spirit is sufficiently rectified, put some of it in a spoon, and put a little gunpowder in, and if it burns out, blows up the gunpowder, leaves the spoon dry, then it is good spirit; but failing in this, and leaving the spoon moist when the flame extinguishes it is not fit for your use.

Of Gum Animæ, Gum Lac, and Gum Sandarack.

To choose these well, as for the first, take the most transparent, clearest and whitest, which is the best.

The second also, called seed-lac, choose that free from dross, sticks or dust, large grain'd and bright.

As for the third, take that which is large, and very white, casting the least yellow, free from dust and dross.

Of Shell-lac, white Rosin, Bole-Armoniac, and Venice Turpentine.

As for the first, that is best which is most perspicuously transparent, will easily melt, and draw out with your fingers as fine as a hair.

As for the second, and the last, choose for your use that which is the whitest and clearest.

As for the third, that is most fit for your purpose

pose that is free from grittiness or gravel, and is of a blackish red colour, commonly called French bole.

Of Gum Elemi, Gum Arabick, and Gum Copal.

As for the first, choose the hardest, and free from dirt and dross.

Choose the second white and transparent.

As for the third, that is best for your use that is whitest, free from dross, and the thick dark stuff incorporated with it.

Of Gambogium, Isinglass Benjamin, or Benzoin, Dragon's Blood, &c.

There are other things necessary in this art and ought to be well chosen.

As for the first, the best is that of a bright Yellow, free from dirty thickness and dross.

Choose as to the second, that which is whitest and clearest, free from yellowness.

As for the third, the best is that of a bright red colour, much like to clarified black rosin, free from all dross and filth.

The fourth, when the best, is of a bright red; free from dross, it may be had as the others, at the druggists, but the prices I set not down, because they generally rise and fall.

Of Silver Dust, Brass Dust, Green Gold, dirty Gold, Coppers, Powder, Tin, &c.

The silver dust, the best is brought from beyond the seas, and is known from the counterfeit by being squeezed between your finger and thumb, giving a glorious, lustre, as indeed it does in the work.

Brass dust, by artist called dust gold, is best made in Germany: the best is of a fine bright colour nearest resembling gold, try it as the silver

er dust; as for the coarse sort, tho' it will work pretty well with gold size, yet it will not do so with gum water.

Green gold is a corrupt metal so called, it is very good in this work, for casting a fading green colour.

Dirty gold is a corrupt metal, casting a dark, dull, tho' silverish colour, bearing pretty well a resemblance to dirty drossy gold.

Coppers are of three sorts, natural, adulterate, and artificial; as for the natural, being cleansed, it may be ground without any mixture.

The adulterate is most fit for a ground, and serves commonly to lay other metals on, as in sketching or heightening gold or silver on; but the artificial is of a higher and brighter colour than either. There are also used in this art, those called speckles of copper, gold and silver, and divers other colours, differing in fineness, which may be worked as the artist fancies, either on the outsides of boxes or drawers, or on mouldings, and may be purchased ready done.

Of Colours proper in Japanning.

Some of these are called transparent on which gold and silver are to be laid, or some light colour, so that by this means they appear in their proper colours, lively and beautiful.

Of these, for a green, are distilled verdigrease; for a red, fine lake; for a blue, smalt; have to grind these on a porphyry, or marble stone, grind with a muller what quantity you please with smalt or verdigrease, with nut oil as much as will moisten the colours, and grind them till they are as fine as butter, put then the colours into shells, and mix them with oil of turpentine till

they become thin for use: lay them on silver gold, or any other light colour, and they will then become transparent, altering their lightness or darkness, according to that of the metal or colours that are placed under them; this for a curious red, may be done with lake, but then use drying oil to grind them with.

If you design figures on the back of your table or boxes, as trees, birds, or flowers, those may be done for white, with white lead; for blue, smalt, mixing it with gum arabick water, and mingle them as you please, to make them lighter or deeper; flake white is a very pure white, but the other will do for ordinary work; and you must use either of these with smalt, or all other colours that have not a body of their own; you may for a purple use russet, fine lake, and sea-green, and it may be done with other sorts of reds and greens, and except transparent colours, all must be laid with gum water.

Seed Lac Varnish, how to make it.

Your ground work is good rectified spirits, of which you may take a gallon, put into as wide a necked bottle as you can get, that the gums may the better come out; then of the best seed-lac add a pound and a half, let it macerate twenty four hours, or till the gums are well dissolved, with often shaking to keep them from clogging together, then with flannel strainers strain it into a tin funnel, placed in the mouth of the empty bottle, the strainer may be made as before directed, and squeeze the dross in the bag, and throw it away as of no use; then let the varnish settle, and pour it off into other bottles, till it rises thick and no longer, then strain the thick part,
and

and settle that again, and keep the fine varnish for your use, and this does as well, without the danger of attempting to boil it, which endangers firing the house, and the party's life.

Shell Lac Varnish how to make it.

This in curious glossy pieces of work is not of value, but in varnished woods it succeeds: To make it, put to a gallon of spirit, a pound and a half of the best shell lac, order it as the former, and tho' it has no sediment, it is proper however it should be strained, to take away the sticks or straws that may be in the gum nor will, it ever be fine and clear as the former, but turns in a few days to cloudiness, yet it is fit for coarse work, and is much used.

White Varnish, how to make it.

Take an ounce of white gum mastic, and an ounce of white gum sandarack, three ounces of the best and clearest Venice turpentine, gum elemi half an ounce, gum copal an ounce and a half, gum benjamin or benzoin and animæ of the clearest half an ounce, and half an ounce of white rosin; and the gums being separated in their quantities provided, put the rosin and copal in a glass vial, with half a pint of spirits, that they may be dissolved; and to the same end, in a glass bottle of three quarts of spirits put the Venice turpentine, animæ and benjamin, and in another bottle the gum mastic and sandarack, in a pint and a half of spirits, then dissolve the gum elemi in a quarter of a pint of spirits, powder very finely the animæ and benjamin, the better to dissolve in the spirit, and then pour them off into one large bottle; let them stand to fine as the former, and then strain them thro' a linen cloth gently,
not

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not hardly pressing the sediment, lest you carry the grittiness of the gums along with you, to injure the varnish.

General Rules of Varnishing.

This is a point nicely to be observed, or your labour and cost may be in vain.

1. If you choose wood that requires to be varnished, let it be exempted from knots, very close grinded, smooth, clean, well rushed, and freed from greasiness,

2. As for your colours and blacks, lay them even, and exquisitely smooth, sweep all roughness off with your brush.

3. Keep your work ever warm, but not so hot to raise blisters, or crack it, which nothing but scraping off all the varnish can amend.

4. After every distinct wash let your work be thoroughly dry, for neglect in this point introduces the fault of roughness.

5. After it is varnished let it lie by and rest as long as your conveniency will admit, and it will be the better.

6. Ever take care to begin your varnish strokes in the middle of the table, or what you do it on, and not from one end to the other, and your brush being planted in the middle, strike it to one end, then take it off and fix it to the place you began at, so draw or extend it to the other end, and so continue it till the whole plain be varnished over, and beware you overlap not the edges, which is when the varnish hangs in splashes or drops on them; therefore to prevent it, draw your brush gently once or twice against your gally pot side.

7. When you have proceeded so far as to come to polish, let your tripoli be very fine, and the
finer

ner the work, let it be still the finer, and use fine rags, keeping your hand moderately hard upon it, and brighten or polish one place as much as you intend, ere you leave it and pass to another, and always have regard, that you polish your work as smooth as you intend at one time, but if your conveniency will admit, let it rest two or three days before you give the finishing strokes after you have polish'd it, but come not too near the wood to make it thin and hungry, for then it will require another varnish, or remain to your discredit.

8. Take a sufficient quantity of tripoli at the first polishing, till it begins to come smooth and so lessen by degrees, and carefully observe there be no scratches or grating in it.

9. When you have a mind to clear up the work, wash off the tripoli with a sponge, and soak up the wet with a fair linen cloth, and with lamp-black mixed with oil, gently smear the whole face of it, let no corner nor moulding of it escape, that the whole piece may be freed, then with other linen, and a hard hand cleanse it of that, and these things done, there will be an admirable gloss.

For white work, let your polish be gentle and easy, do it nimbly, and clear it with oil and fine flour; and in exactly observing these rules you will prove an Artist.

Of Black Varnishing or Japan.

Provide for this imitation of japan, a close grain'd wood, well wrought off, rush it smooth, and keep it warm by a fire, but never so near as to burn, scorch, or blister your work, then add seed-lac varnish, as much lamp black as will at the first strokes colour the wood; do it three times, permitting it to dry well between every doing,

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doing, and also rush it well, and then with a quarter of a pint of the thickest seed lac, mixed with an ounce of Venice turpentine, put in more lamp black, so much as may well colour it and with this wash it six times, letting it stand twelve hours between the three first and the three last washings; then with the finest seed-lac just tintured with the black, do it over twelve times, letting it dry between every time doing, after which let it remain for five or six days before you polish it.

At the end of that time, take water and tripoly, and polish it, having first dipped your cloth in water, and rub it till it gains a very fine smoothness and gloss, but do not rub so as may any ways wear off the varnish, which cannot be easily repaired; then use a rag wetted without tripoly, and clear it up with oil and lamp black, yet polish it not all at once, but let it have some days respite between the first and last polishing, and at least three or four days.

White Varnishing or Japan.

This must be curiously done without any soiling, and therefore you must be cautious of letting any dirty thing come near, whilst you are doing it.

To begin this work, scrape as much isinglass as will make it of a reasonable thickness, or when dipping your pencil into it, it will with a stroke whiten the body which has been passed over with a brush, but let it be in neither of the extremes, too thick or too thin, then mix it, with your size, whiten your work over with it, and when dry repeat the same, covering it from all manner of dust before it is varnished; it must be whited three times, and dried between every one of them, smooth,

smooth, and lay it as close as you can to the wood with your rushes; then mix white flake with your size, only so that it may lie with a full and fair body on the piece, and whiten your work three several times with this, drying between each, then make it with your rushes very smooth, but keep your distance from the wood.

In the next place, take white starch boiled in fair water till it come to be somewhat thick, and when it is luke-warm, wash over your work with it once or twice, drying between whiles, and let it then stand 24 hours, then take the finest of the whitest varnish I have directed you to make, wash your pencil in spirits, and wash or anoint your work six or seven times, and after 30 or 40 hours do the like again, and if done with a dexterous hand, a better gloss will be set on it, than if it had been polished; but if it miss of that gloss, it is requisite that you polish it; and in order thereto you must accommodate it with five or six washes of varnish more than the former, and it must continue to settle well about a week before you polish it.

In polishing, your linen and tripoly must be of the finest, being neat and careful in this operation, your hand caried light and gentle, having your cloth neither too dry nor too wet, and clear it up with fine flour and oil.

Ifinglass Size; how to make it.

Break and divide an ounce of ifinglass into little pieces, put it into a glazed, clean and well covered pipkin, and let it for 12 hours soak in a pint and a half of fair water, then place it over a gentle fire, till it boils well at leisure, and when the water is consumed to a pint, let it stand to cool

cool leisurely, and then it will be a jelly, and may be used in the white varnish and other works, but make no more at a time than you will use, for in two or three days it will prove naught.

Red Japan; to make it.

The reds are properly three, viz. the common red, the deep dark red, and the light pale red.

In the first vermillion is proper, mixed with the thickest of seed lac, warm the work and mix your vermillion with the varnish in a medium, carry it over in four times, permitting it to dry as the former and if your reds be in a good body and full, rush it smooth, then with the ordinary seed lac varnish wash eight times, and after 12 hours rush it again, and for a curious outward covering, give it eight or ten washes with seed lac varnish, and after five days polish it, and clear it with lamp black and oil.

Of the dark red.

The common red laid as before directed, deepen it with dragon's blood mixed with your varnish, and when it has a pretty good colour, go over it with lac varnish, which will much deepen and strengthen the colour; and in all things else, as to polishing and clearing, do as in the former red.

Of the pale Red.

To do this, grind white lead with a muller on a stone, and when it is finely done, mix it with so much vermillion as will make it a pale red, mix varnish with them, and give the work four washes, and follow the prescription of the common red, considering the after varnish will heighten the colour.

An Olive-colour'd Japan.

Take English pink colour, grind it with common

on size, and when it is like pap, mix with it a proportion of lamp black and white lead, and work it as in other japanning.

Chestnut-colour'd Japan.

To do this, take indian red or else brown red oaker, grind it well, and mix it with ordinary size, and then grind a little white lead, extraordinary well with the small size, mix with it lamp-black, and so both with the indian red oaker fair and well, incorporate them together; if the colour be too bright darken it with white lead, and so bring the colour to your mind, considering always that your varnish will heighten it.

With this wash over your work, let it dry, and repeat it till your colour lie full and fair, rush it smooth, but not close to the wood, unless you design anew to begin your work, and give it a second varnish, and in three days give it a lustre with seed lac, and when dry, fit it for polishing with white lac; varnish and clear it with oil and lamp black.

Blue Japan.

To do this, grind white lead very fine, add small as finely ground, mix them with isinglass size, the white lead grind with gum water, let there be a proportion of white and blue, and mix them well to the thickness of common paint, go over your work with it, and when it is well dry, proceed so three or four times, till the blue lies with a fair body, rush it smooth, and go over it again with stronger blue, and when dry wash it with the clearest isinglass size, having a new pencil for that purpose, then when it is dry, warm it by the fire and go over it with a pencil dipped in white varnish seven or eight times, and

Let it continue for a day or two, then wash it as often as before, and so continue many operations at intermitted times, for a week at least must pass before you can well venture to polish it, and when it is polished, clear it with oil and lamp black.

Note. That in no wise you mix your colours with isinglass colours too strong, lest when dried they be apt to crack, fly, and spoil the piece; but when you lay your wash of clear isinglass, to keep your varnish from tarnishing, or soaking into your colours then it is proper that it be of a full and strong body.

Of Speckles, for the Adorning Japann'd Wood.

Mix so many speckles as you have occasion for, with ordinary lac gum varnish, so much as when they are put into a gally pot, will fit them for working with a convenient pencil, but not so thick as colours, keep them stirring very well with a brush, and generally warm by the fire: This continue till you perceive the speckles lie thick and even to your mind, so beautify them with three or four washes of varnish, mixed with turpentine, and this, unless you intend to polish, will be sufficient, but then you must give it after all this, eight or ten washings with the prime lac varnish drying between whites, and then polish; and on this manner you may lay on all colour'd speckles; but silver requires seed lac varnish, and the best white varnish, ere it can be brought to a good polish, but if not to be polished, you may spare your varnish.

To lay on Speckles in Japan Work, &c.

If you design to adorn your work with flowers, rocks or garments, &c. varnish the places intended.

ded with a fine pencil, and through any small
 ve, shake the colours you design, whilst the
 mish is wet, and sweep up in rock work all
 eckles that straggle on the edges, with a new
 y pencil, lodge them on the sides and top of the
 ck, which sticking, will render the work more
 autiful, and give it a shadow or reflection.

This must be done with all diligence, and no in-
 mission had till finished, till once covered and
 ing once dry, operate again, and so one upon
 oother successively, to shape it to your mind;
 and in sweeping the speckles, intermix not one
 ortion of scattered parts with the other, that are
 f a different colour, but every parcel in the pro-
 per station to beautify the better: At first when
 id, it will look dull and heavy, but the secur-
 ng varnish in a little time will add to it a plea-
 ant beautiful colour; and so you may do flowers,
 rees, garments, and many pleasant things to
 adorn your work.

Wood, how to overlay, with Gold or Silver.

To prepare this work, you must be furnished
 with parchment size, that is, the cuttings of parch-
 ment, boiled in fair water to a jelly, and when
 strained and cooled, it will prove a strong size.

When you are to use it, put as much as you
 shall want into an earthen pot, and make it hot,
 then as it is cooling, scrape as much whiting into
 it as will colour it, mix them well with a clean
 brush, and with this mixture white your wood or
 frame, striking or jobbing your brush against it,
 that it may the better enter into the hollowneses
 of carved work, then give it rest that it may dry.

This done, melt the size again, and put in
 more whiting to render it some degrees thicker,

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and with this do over the frames seven or eight times, or as you see there is a necessity, and when it is dry open with a gouge no bigger than wheat straw the veins in the carved work that the whiting has stopped up, then with a fine rag and your finger, carefully smooth and water plain it over, and rush it smooth when dry if necessity require it; and in this condition it will well receive your gold or silver size. But before I proceed, I shall teach you to make these sizes.

The best Gold Size at present in use.

Take an equal quantity of the best French and English bole armoniack, grind these fine on a marble stone with fair water, then scrape into it a little candle grease, incorporate and grind all these well together, then mix a little quantity of parchment size with a double proportion of water, and the business is done.

The best Silver Size in use.

Grind fine tobacco-pipe-clay very small, mix with it as much lamp-black as will turn it of a light ash colour, and to these add bits of candle grease, grind them very fine together, a mixture of size and water, and try these on the corner of the frame; if it be rough in burnishing, put more oil or grease, and as near as you can bring it to a due temper, that it may work well.

To Size your Frames, or other matters.

To do this make the size blood warm, and with a fine brush stir it very well, till it is somewhat thin, go over the frames with it twice or thrice, yet touch not the hollow parts of the deepest carvings where the gold cannot conveniently be laid, for the yellow colour nearly resembling first laid

on,

the fault will not soon be discovered; let it four or five hours, and then try the gold if it will burnish on it, if not, alter the size, and try it over again.

To lay on the Gold in order to Burnishing.

Let your frame, or other matter intended, be set on an easle, place the leaf gold on a cushion to be held in your left hand with the pallas and pencil. You must for this work have a swan's quill pencil, or a larger of camel's hair, if the work require it, dip it in water, and wet no more of your frame at a time than will take up three or four leaves, make your beginning at the lower end, and so proceed upwards, laying on whole leaves, or half ones, as it requires; then wet such another part of your work, and lay on the gold with your pencil, or cotton, gently pressing it very close; and having gilded the upright sides, turn the frame, and proceed the same way with the ends, then survey the spots and places that are omitted, and cut small parts of gold to cover them, when wetted, with a smaller pencil than before; when it is so finished, let it stand till the next day that time you leave off.

To Burnish the Gold Work.

Take a wolf or dog's tooth, if you cannot get agates or pebbles formed into the same shape, and burnish so much of the work as you design, leaving the ground of the carving untouched, and some other parts, as you see best convenient, which in respect of the burnishing being rough, the better sets it off; that which is omitted to be burnished must be matted, or secured with seed lac varnish, or lacker; if you design it a deeper colour, then must your work be repossess, or set off with

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lacker, mixed with saffron or dragon's blood, the colour called Ornator, and with a fine pen dipped herein touch the hollowneses of the carving, and the veins of the foldages or leaves; if you fancy it is not deep enough, you may by a repetition make it so, and the work is done.

To lay on Silver Size.

Warm the silver size that is newly ground and mingled well with weak size, as you did the gold size, do it once or twice, and let it dry, and touch the leaf silver, if it will burnish on it, it is prepared for the work; but if it will not, make an alteration in the size, and for the rest lay on the leaf silver, and do as you did by the gold, and it will answer.

Note, As farther rules, and ever observe them.

1. Let your parchment size be pretty strong, keep it not long lest it spoil.
2. Grind no more silver or gold size than just you have present occasion for.
3. Ever keep your work clean from dust, after it is sized and gilded, or else in the burnishing, it will be full of scratches.
4. Do not whiten or burnish gold size in hard frosty weather, for then the whiting will be apt to peel off, and the gold flaw.

The ART of Gilding METALS.

To prepare the Gold.

Take Ducat or leaf gold, what quantity you desire, observe to beat the ducat very thin, and put this gold, with as much quick-silver as will just cover it, into a gallypot, where let them continue half an hour, where immediately after the mixture, stir them with a stick, then strain them thro'

thro' a piece of leather, squeezing with your hand till you have forced out as much quicksilver as you can industriously do, so that what remains in the leather, looks more like silver than gold, yet this only must be employed in gilding, after the following manner.

To gild with Gold, Silver, Copper, Brass, Princes Metal, &c.

Brush first your metal well with a wire brush, wet it with water or beer, and brush on till the dirtiness or filth be quite removed, that the gold may more closely join it; prepare then your quicksilver, by mixing it with a little Aquafortis in a viol, three or four drops of the Aquafortis to an ounce of the quick silver, quicken your work with it, viz. rub it over with a rag or your finger, till it appears all silvered or touched. This done,

Take your prepared gold, and with a small knife, or iron tool proper to the purpose spread or overlay the whole piece, omitting no part, give it two or three little heats before you give it a through heat, so that with a hair brush, like a comb brush, you may dab and spread your gold, these little heats making the quicksilver more ready to comply; then give it the thorough heat, which will compel the mercury or quicksilver to evaporate or fly away; then take it from the fire, and with a scrub brush, untouched with quicksilver, cleanse it as at first; if you perceive any untouched spot of quicksilver, the gold must be laid on it again, when it is cleansed with a scratch brush, and after this manner you may heighten the colour if you see it necessary.

To heighten the colour of Gold.

Take an equal quantity of salt, argol and brimstone, mix them with as much fair water, as will cover the gilded metal when put into it; boil them well, and tying your gilded metal in a string, plunge it in for a little space, often plunging, and looking as often on it as you draw it out, and when the colour is heightened to your expectation, dip it in cold water, and the work is done; you may in the foregoing manner double or treble gild, till the gold enriches it to be of a lasting thickness, and colour.

To counterfeit Tortoiseshell.

To do this well, let the wood you intend to work on be very close grained, clean and smooth wrought off, as pear tree, or the like; but if rough grained, you must prime it with whiting, as you are taught in black japanning, for coarse grained woods, rush it smooth, and go over it with seed lac varnish, the breadth of a silver leaf, which take up with cotton, and lay on it moist, as close as may be; then wash again, and place on another leaf of silver, and so continue till the wood is overspread with silver, and when dry, sweep off all the loose silver with a hair brush, then finely grind collin's earth, and mix it with gum water or common size, and with this, (having added more size or gum water than it was ground withal) spot or cloud the ground work, having a fine true, natural shell by you to imitate, and when this is done, you will perceive several reds, lighter and darker, appear on the edges of the black, and many times lie in streaks on the transparent part of the shell; to imitate this finely, grind sanguis draconis with gum water,

water, and with a fine pencil draw those warm
 reds, flushing it in about the dark places more
 thick, but fainter, thinner, and lesser of colour
 towards the lighter parts, so sweetening it, that
 it may in a manner lose the red, being sunk in,
 in the silver, or more transparent parts.

When it is done and dried, give at least six
 washes of seed lac varnish, and when it has con-
 tinued 24 hours, rush it gently, and when it is
 smooth and fit for the second operation, grind
 gambogium very finely in an equal small quantity,
 put these into as much seed lac varnish as will
 serve to wash it another six times, then let it
 stand 12 hours, and give it the third varnishing,
 and with the last mixture wash it so often, that
 the silver is changed to a golden colour, and the
 work is done.

To die Wood a curious Red.

The wood that takes this colour must be very
 white, and to begin it, put a handful of allum in
 a moderate kettle of water, and cast your wood
 into it, and when well soaked, take it out, and
 put in two handfuls of rasped brazil wood, and
 when that has boiled well, put the wood in again
 for a quarter of an hour's boiling, and it will
 take the colour.

To stain a curious Yellow,

In this case, take the knotty ash or but, that
 is very white, knotty and curled, smooth and rush
 it very well, and when it is well warmed, wash it
 over with a brush dipped in aquafortis, then hold
 it to the fire till it begins to smoke, rush it again
 when dry, and polish it, and varnish it with seed
 lac, and it will be of a curious colour, not in-
 ferious to any outlandish yellow wood, and if

you put filings or bits of metal, as copper, brass, &c. each metal will produce a different tincture.

To Stain or Die Wood Black.

Boil logwood in water or vinegar, and two or three times brush or stain your wood with it when very hot; then take nut galls and copperas, bruise them well, and boil them in water, and with it wash or stain your wood so often, till it be a perfect black; or rather steep it in the hot liquor if you can put it in, and the dye will penetrate the better. Read more of this in *Art's Treasure*.

To Dye or Stain Wood for inlaying of Flowers, or other things in Cabinets.

Get moist new horse dung, and squeeze out the moisture thro' a cloth, put it into several small vessels fit for your purpose and dissolve gum arabick and roach allum, each the quantity of a walnut, and with these mix reds, greens, blues, or any colour that is suitable to the work, stir them often three or four days, then take your wood, particularly pear tree for white, cut it into the thickness of half crowns, or so much as will suffice any inlayed work, and in a square or length, according to your desire, boil up the liquor or colour very hot, and put in the wood till the colour has well taken; some indeed you may take out sooner, that the colour being less strong, may the better agree with your party-coloured flowers, shading and the like.

To Dye or Stain Ivory, Bone, or Horn, Red.

Soak fine lime about 12 hours in fair rain water, then pour off the water well from the settling thro' a linen cloth, and to each pint put
half

half an ounce of rasped brazil wood, and having boiled your materials in allum water, boil it in this, and it will give a curious tincture.

To Stain Horn, Bone, Wood or Ivory, Green.

Prepare your materials by first boiling in allum water, then grind the common thick verdigrease or spanish green, a moderate quantity; adding half as much sal armoniack, and put them into the sharpest wine vinegar, as also the materials you intend to stain, and keep them there till they have taken a good tincture.

To stain or dye Horn, Box or Ivory, a curious Black.

To do this, put small pieces of brazil wood into aquafortis and so continue them till they appear green, then wash well your materials in them, and boil logwood in water, into which put them whilst they are warm, and in a little time the ivory, &c. will be of a curious black, so that being polished, it will look like ebony or japan; and if you would have any part for flowers or the like, remain white, draw them before staining with turpentine varnish, and the black will not touch them, and afterward you may fetch them, and clear up with oil and lamp black.

To stain skins Green.

Bruise a good quantity of the leaves of nightshade very well, dissolve in the juice well strained out about two ounces of allum, then put in half an ounce of verdigrease, suffer them to stand over a gentle fire 24 hours, when warm, dip in a brush, and strike over your skins; let it dry, and repeat it till it has taken a pleasant green.

An approved way to colour white Leather.

These skins must be hung in lime or chalk-water, that the wool or hair may be entirely stripped

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stripped off, and they become supple, stretch them forth on tenters, brush them over with allum-water very warm, and so tincture them with the colours you design, suitable to your purpose:

To put a curious Black on Leather.

Take two pounds of the inward bark of an old elder, the like quantity of the rush or filings of iron, put these into two gallons of rain water, and close them tight up in a vessel, and when they have stood about six weeks, put in a pound of copperas, let them simmer a considerable time over a fire, and after 24 hours standing, and often stirring, pour out the liquid part, and go over your leather with it warm, and it produces a curious German black.

To colour Leather a bright Red.

Dip your leather first in allum water, and rub it well therein; then take stale urine, boil it till it is half consumed, scum it well, and put to it an ounce of the best lake, rasped brazil wood two ounces, and an ounce of allum; add to these half an ounce of sal armoniack, stir them well over a moderate fire two hours, pour off the liquid part, and brush over your skins with it, till it takes a good tincture, remembering ever to let the skins in all colours, dry well between each going over with your brush, and your expectation will be answered to a very considerable advantage.

A curious French Yellow for skins.

Take wood-ashes and chalk, of each a like quantity, and when you have made a good ley with rain water, strain out the finest part, and set it over the fire, then put in a sufficient quantity of turnerick well bruised or beaten to powder,

der, and as much saffron as may give a lively tincture, let it stand over a moderate fire, but not boil, till it becomes pretty thick, and being warm, colour the skins with it.

For a deep Blue, or Purple.

Strain out the juice of elder berries, put to two quarts, an ounce of allum, half an ounce of smalt or indigo, set these over a gentle fire, and when warm, brush your leather over with this composition.

For a Crimson Velvet.

Dissolve cake soap in fair water and bole armoniack, each three ounces, place it over a gentle fire till the liquor grows clammy; then put in a little handful of grains of cochineal, two ounces of red lead; an ounce of lake, a quarter of an ounce of vermillion and a little piece of indigo; beat these over a gentle fire till they are as thick as the glare of an egg; then go over the skins with a soft brush dipt in it, till the colour arises to your mind.

To imitate Turkey Blue.

Take two ounces of smalt, a quarter of a pint of red wine, half a pint of vinegar, an ounce of white starch; incorporate these over a fire, till they come to a moderate thickness, then soak the skin in allum water; add to the composition a pint of water wherein gum arabick has been dissolved, and stir it well; go over the skins three times, drying them between whiles, and when well dried, polish them over, to make them glossy.

For a light Green.

Take the juice of the herb called Horsetail, add to it a little allum, verdigrease and copperas.

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To cover or dress skins with Gold or Silver.

Grind brown red with a muller on a marble stone, add to it a little water wherein chalk has been dissolved; and lightly go over the skins till they look whitish, and before they are dry lay on the leaf gold or silver, a little lapt one over another, that no space be found wanting; when they stick well to the leather and are dry, polish them over with smooth ivory, or a horse tooth, and it will give a very glorious lustre. The silver you may go over with lacquer varnish, and change it into a Gold colour.

Or another way, Take glare of eggs or gum-water, brush the skins over with it, so lay on your leaf gold or silver, doing as before.

To make skins shine without Silver or Gold.

Take gum water, the glare of eggs and the powder of antimony, grind and mix them well together, and the skins being dry; lay it on with a brush three or four times, letting them dry between every time; then brush them over, and they will have a curious gloss like silver, which tintured with lacquer varnish, will produce a fading gold colour.

To dye Bristles a Red Colour.

Take half an ounce of allum, a quarter of an ounce of vermillion, and an ounce of rasp brazil wood; put these into a pint of vinegar, so boil them moderately thick, and dip in the bristles when 'tis very hot; which continuing there some time, 'twill be a fine red. You may make larger quantities of the liquor with ingredients proportionable, and thus dye feathers.

To dye Feathers or Bristles Green.

Take verdier and verdigrease each an ounce,

put

put them into a pint of water, soak the feathers or bristles in hot water, and then put them in this liquor boiling hot, and there remain until they have taken a good colour. According to the complexion of your dyes, you may make them this way any colour.

For Blue, let your dyes be indigo and bice.

For Black, galls and logwood, with a little copperas.

For Purple lake and indigo.

For Carnation, smalt and vermillion.

For Yellow, yellow berries and saffron, dissolving a little tartar in your water.

For Orange, Turmerick and red lead. And so of any other colour you fancy.

Of dying Silks, Stuffs, Cloths, Thread, and other things, of divers curious Colours.

To dye Silk a sanguine Colour.

Take a pound of green wood, and as much allum, bruise them, then pour on them fair water, and half a pound of rasped brazil; set them over a gentle fire well to mix them, then put in the silk, suffering it to seeth therein, and so continue it, strengthening your dye, and dipping till you perceive the colour has taken well; after that rince it in ley of wood ashes or oak-bark, and so clear it with fair water, then dry and press it.

To dye Silk a deep Carnation.

Take white gall and allum, the herb called Foli well dried the quantity of a pound, two ounces of spanish red, four of indian lake; boil them in fair water over a gentle fire, and when they come to the height of tincture, dip your silks

silks in them; and let them have good dippings three or four times, and the colour will take very well.

To dye Silk Quoins Red.

Let these be steeped in allum-water, then give them a gentle heat, adding in the heating bran-water, a pound and a half of green weed, so heat it up and put the silk into it, but let it not seeth, then rince it in ley of wood-ashes, after that in water then put in your logwood rasped or in powder, and so heat up a second time; so in thrice dipping, the business will be accomplished.

To dye a curious Yellow.

Take woad, the stalks, seeds and leaves and lay them to soak in wood-ashes leys three hours, then seeth it till it is sufficiently sodden, and put it into a mixture of hot water and urine, so beat it up, and strain the liquid part thro' a sieve or strainer, adding verdigrease, and so boil it up with the ley already sod, stirring and well-mixing the liquor about three hours, and when it is very hot, dip three times.

To dye Silk a Rose Red.

Take to every four yards and a half you intend to dye, a pound and a half of nut-galls, boil them in fair water unbruised two hours, shift the water, then put in the silk or linen, letting it soak four hours, then wring it dry, and heat in fair water wherein allum has been dissolved, then put in half a pound of brazil powder, and a pound of green weed, and so by dipping in gentle heats the colour will heighten.

A good black Water for Silk or Cloth.

Take an ounce of lamp black, half a pound of

of nut galls, bruise the latter and put them into a bottle of water, with a handful of the filings or rust of iron, beat them up, adding a quarter of a pound of copperas, seeth it to a third part consumption, then add half a pint of gum water, and it will not only be fit for present use, but keep long, and be a very good black.

To dye Purple.

In this case if you dye silk, you must take to each pound of it an ounce of allum, and a gallon of water. dissolving the allum therein over a gentle fire, then put in the silk, and let it continue there about four hours, then take lake and indigo, each a quarter of a pound, a quart of urine, then adding a little handful of cochineal, heat them up into a dye, and dip your silks or fine stuffs into it as usual.

To dye a very fair Blue.

Take any silk, stuff, or cloth white, and soak it in water, that done, wring out the water very well, and add two pounds of woad, a pound of indigo, and three ounces of allum, give a gentle heat in fair water, and so dip till you perceive the colour to take well.

Carnation.

To make this a curious right colour, take dried purper, soak it in man's urine for a night, then take what you have to dye, and soak in allum water twice, seeth the purper in fair water, and then set another vessel to receive the liquor and dip therein.

For a pleasant light Red.

Boil two gallons of wheat, and an ounce of allum in four gallons of water, strain it thro' a fine sieve, dissolve more allum half a pound, and

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as much of white tartar; add three pounds of madder, to perfect the colour, and put in your stuff, cloth, &c. at a moderate heat.

Black for Velvet, &c.

Take half a pound of copperas, a gallon of smith's water, two pounds of galls, burnt ivory, oak bark, and shoemaker's black, each an ounce, well ground, two gallons of fair water, mix them well, and set them in the sun or other warm place a month, often stir it, and at a moderate warmth dip your velvet, or other things designed for deep black.

To make Red Water for Silk or Woollen, Violet, Green, Azure, or Yellow.

Take two gallons of fair water, four ounces of brazil, and being half consumed in heating, remove it from the fire; then put in an ounce of grains, a quarter of an ounce of gum arabick, with a quarter of a pound of allum well bruiled, and having stood all night it may be used in the morning.

To dye Woollen Yarn, or Wool.

Take two pounds of wood to every four pounds of yarn, &c. and two gallons of water; put in two handfuls of wood ashes, and when it seethes put in the yarn or wool, and let it continue half an hour or more, then wring it and put it in again, and let it seeth as long as before, and if it were a brown blue, it will be a dark green, or of a white yellow colour.

To make Bran-Water.

This is very necessary in dying, and therefore you ought to know how to prepare it. Do it with half a peck of wheat bran to two gallons of fair water, and half a pound of bruised allum,

over

over a gentle fire; suffer it to stand about a week, often stirring it before you use it.

To make Grey Florrey.

Let the florrey be soaked 24 hours then wring it thro' a cloth, and take ashes of vine-sprays, with them make a ley, and upon a table spread the florrey about two hours; put the ley into three vessels, and shift the florrey out of one into another, and before you dip put vinegar in, so the florrey will be right, and your colour good.

To dye Linen with Crampenade.

To three ells of linen use a pound of the crampenade, and a gallon and a half of water; so to a greater quantity proportionable; set it over a fire till it begins to settle, put in at that time two bunces of galls, then your linen, and when you take it out, which must be often, wring it and put it into allum water, but if you would have the colour darker, it is requisite to have a ley of unslacked lime, or chalk-stone.

To dye Linen, Thread, or Cloth, a good Red.

Soak a pound of samfleur 24 hours, in two gallons of water, suffering it to heat over a gentle fire; add two ounces of vermillion, half a pound of rasped brazil, and an ounce of allum dissolved in fair water. so dip and order as other things.

Thus, Reader, have I given you a great Insight into the Mystery of dying Silks, Stuffs, Cloths, and other things relating thereto, which may by practice prove advantageous.

The

The ART of Perfuming.

To make Essence of Hypocras.

Take a strong glass bottle, put half a pint of spirit of wine into it, add an ounce of cinnamon, half an ounce of cloves, a gross of ginger, and as much coriander as you can hold with your fore finger and thumb well beat, three or four grains of black amber, or ambergrise, beaten in a stone mortar; stop the bottle fast, and set it on sand, exposing it in the sun for a month. In this case, it must not be full, nor stand for rain to touch: This is a curious and wholesome perfume.

Essence of Amber.

Put a pint of spirits of wine into a strong glass bottle, then in a small stone mortar beat a gross or the eighth part of an ounce of black amber or ambergrise, put it to the spirits with half a gross of the bladder of musk very small; stop it close, and set it for a fortnight, as the former, shaking it twice or thrice a day when the sun shines hot upon it; then let it stand quiet another fortnight, and it is done.

Rosa Solis, or Perfumed Liquor.

Put two pints of water and two pounds of sugar into a copper pan over a gentle fire, let them boil to the consumption of a fourth part, then put in two spoonfuls of orange-flower water, throw in the white and shell of an egg well beaten with a whisk, stirring it in the liquor; when it boils take it off and strain it thro' a bag several times, and when you perceive it well clarified, pour in of the best brandy, then essence of hypocras or amber, and you'll have excellent perfum'd Solis.

Angel

Angel Water.

Put into an earthen pot a quarter of orange-flower water, a quarter of a pound of benjamin, two ounces of storax, a quarter of an ounce of cloves, half an ounce of cinnamon, two or three bits of calamus; set the pot on a gentle fire to the consumption of a fourth part, add a bladder of musk, then let it cool; strain it well from the dross, and put it up for use.

Millefleur, or the Water of several Flowers.

To do this, put in a strong glass bottle a pint of angel water, then in a little mortar beat twelve grains of musk, then put several flowers of various scents, more of the weaker than of the stronger, that there may be temperance, and allay them with that water, and when well infused, pour it off into a bottle, and keep it well closed for use.

Orange-flower Water,

To make this well, infuse two pounds of orange flowers in a quart of water three or four hours, and so distil them in a cold still: This water is good for cleansing snuff, making angel water, or perfuming wash balls or skins.

The Queen of Hungary's Water.

Put a quart of the best spirits of wine into a strong glass bottle, and two large handfuls of rosemary flowers, a handful of Thyme, and half a handful of sweet marjoram, the leaves only, and as much of sage, keep the bottle close stopp'd, and expose it to the sun a month, and then you may dissolve the bigness of a bean of orcanat, bruising it with a little spirit of wine, and put it into the bottle; then expose it four or five days more to the sun, and it will be of a fine red colour, and a curious scent.

Pastils

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Pastils or Perfumes, of divers Kinds.

Pastils of Roses made into Wax Candles.

Take a pound of the dregs of angel water, beat them when dry'd very fine, and searce them thro' a hair sieve, then put to them a handful of the leaves of roses newly gathered, dissolve gum adragant in rose water, and beat the whole long together, to well incorporate it, then roll up pieces as big as your finger taperwise, and when they are dry they will burn like a candle, and give a very curious scent.

Perfum'd Pastils for beads or medals.

Dissolve gum adragant and arabick in millefleur water, and put into it marchal powder as much as will stiffen it into a paste, rub the moulds you cast them in with essence of flowers, and the beads or medals will be of a curious brown or coffee colour.

Another.

Take of frangipan and cyprus powders, each a like quantity, put them in gum wherein millefleur water is the greater part, and make them into Pastils.

To make a liquid Snuff, excellent for the cure of the Head Ach, or against Apoplectick Fits; a rare Secret.

Take distilled betony water a pint, half a pint of rosemary flower water, infuse in these four ounces of the best Virginia tobacco, finely sifted into powder; let them stand warm by the fire, or in the sun 24 hours, then squeeze out through a very fine clean cloth the liquid part, scent it with a little ambergrise, and a very small quantity of musk, drop into it three or four drops of chymical

chymical oil of nutmeg, or cinnamon, shake it well when the settings are taken off, and keep it in small close vials for use, snuffing or spirting up a very small quantity at a time into your nostrils. The scent, of it, without snuffing up, cures an ordinary head ach.

Cosmeticks, or curious Receipts for beautifying the Face, Hands, or any part of the Body.

Benjamin Water, an excellent Beautifier

Take a pint of good strong brandy, a pint of spirit of wine, half a pound of benjamine, and a quarter of a pound of storax, an ounce of cinnamon, and half an ounce of cloves, and four nutmegs; beat the spices and benjamine, and putting them into the liquids, stop them up close in a strong glass bottle, and let it stand upon sand in the sun, in the heat of summer a month, and then pour it off and clarify it.

This cleanses the skin of morpew, Tannedness, or sun burning, and causes a delicate complexion, as does the queen of Hungary's water, which I have already taught you to make.

To prepare Sponges for the Face

Having chose the best and smoothest sponge, and cut off what is superfluous, soak it, changing the water till it looks clear, then dry it, and dip it in orange flower or angel-water, pour over it a little essence of amber, then squeeze it, but a little and let it dry, and it will be for your purpose, in cleansing and beautifying the skin, far beyond the use of linen.

To cause a fair Complexion.

Distil Fumitory, rosemary flowers and scabious,

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ous, each two handfals in a bottle of white wine, and a quart of dew gathered off the grafs or corn, with clean napkins and handkerchiefs, and so wrung out. Keep it close stopped in glafs bottles, and wash the face and hands with it as there is occasion.

To cause a fair Complexion.

Take oil of myrrh an ounce, three drops of oil of sulphur, an ounce of the oil of sweet almonds, mingle them well, and anoint the face going to bed, and the next morning take it off with benjamine water.

To make a clear pale Complexion.

Distil the blossoms of pease, beans and peaches, each a good handful, in two quarts of whey, and wash the face.

A Pomatum to refresh the Complexion. and take off Pimples and Redness.

Take half a pound of the leaf of a hog's fat, work it well in fair water till it is very white, then put it into a new earthen pan; put in a quarter of an ounce of copperas, two pippins cut in pieces without paring: mix an ounce of the oil of sweet almonds, then strain it thro' a linen cloth into clean water, and make it into pomatum, so with it anoint the face.

To take away Freckles.

Take the gall of a cock, an ounce of rye meal, a quarter of an ounce of the juice of hemlock, an ounce of oil of turpentine; make them into an ointment, and anoint the freckles with it, and in a little time they will disappear.

A Pomatum to plump the Lips and Cheeks.

Take an ounce of fresh butter, and as much virgin wax, set them over a gentle fire, and throw in
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Robert Wood

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black grapes, bruise them with a ladle, then put in two ounces of orange flower water; bruise in a poringer the bigness of a bean of orcanet, allay it with a little orange flower water; put them into the pomatum, working them up together with a spoon, and then put it up for your use.

A liquid Paste to wash the Hands without Water.

Take of bitter almonds a pound, bruise them well in a stone mortar till no lumps remain; wet it with a little milk, and, make it into a paste; beat the crumbs of white bread with a little milk, and put these with the yolks of eggs without the treadle into the mortar to the paste. Beat them up yet more, and then boil them till thick, and keep them up for use.

To take Spots or Stains out of the Face, Hands, or any part of the Body.

Take litharge of silver an ounce, the juice of lemon and a sea onion each a spoonful, mix these with a quarter of a pint of white wine vinegar over a gentle fire, and apply a rag dipt in it to the spot, and often doing so will remove it.

To whiten the Teeth like Ivory.

Take bruised coral and pumice stone finely sifted, and by rubbing the teeth well with them they will be as white as those of infants.

To make Hair grow and curl.

Take the ashes of fern roots a handful, as much of those of the ying, and make a ley with them in ox urine, boil in it a handful of the tops of hyssop, so wash the ends and roots of the hair with it, or any bald place, and the hair will immediately grow and curl.

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To

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To take Spots and Stains out of Silks, Stuffs, Woollen, Linen; also Pitch, Tar, Rosin, Wax; and to recover faded Silks or Linen.

To take Spots or Stains out of Silks.

Take an ounce of flax seed, bruise it well in two or three spoonfuls of juice of lemon; add a quarter of an ounce of white lead, and as much of burnt bone, mix them over a gentle fire to a thickness; lay them on the strainer.

To make a Soap that will take Grease, Spots, or Stains out of Cloths, Silks or Stuffs.

Burn a pound of roach allum, and finely powder it; add to it half a pound of the root of an herb called Florence-flame, a new laid egg, and two pounds and a half of cake soap; bruise and mix them well together, that they may be made up with fair water into balls; then first wash the place stained or spotted with fair water, scrape the soap moist on it, and wash it out, and in three or four time thus doing, the blemishes will disappear.

To take Spots out of linen.

Take two spoonfuls of the juice of an onion, and as much of lime juice; wet it two or three times, as often drying it by the fire; wash it immediately in a good laver, and it is done.

A good Ley to take out Spots or Stains.

Put half a pound of soap-boilers ashes into two pints of water, let them remain three days, with often stirring; then pour off the clear ley and mix it with fuller's earth; then lay it thick on the place drying it in the sun, or by a fire, and
in

Silks, itch, over
 in two or three times doing it will answer your expectation.

To take Spots or Stains out of coloured Silks, Stuffs, Linen or Woollen.

Take pumice stone and grind it to powder, put to it sharp vinegar and fuller's earth; let it lie on and dry, then wash it out with milk and flower of almonds.

A Way to take out Tar, Pitch, or Rosin.

Dab on this oil of turpentine, let that dry and put on more, and the third time when it is dried you may rub out the Pitch, &c. for it will crumble like dirt.

To take out Oil or Grease.

Mix burnt bone and fuller's earth with a little white wine, and plaster it on the spot, then dry it in the sun or by the fire, and it will suck out all the grease in once or twice doing.

Sweet Powders, Perfumes, &c.

To make gross Powder a la Marchale.

Take of iris sixteen ounces, of dried orange-flowers twelve ounces, coriander four ounces, a pound of province roses, two ounces of angel-water dregs, an ounce of calamus, two ounces of fouchet, half an ounce of clove, beat them well one after another in a mortar, then mix them, and finely sift them into one incorporated powder.

Powder of Jessamine.

To make this mix about a thousand sprigs and flowers of Jessamine amongst twenty pounds of fine starch in a close box, lay them even, making a bed of flowers, and another of powder, and let them lie 24 hours without touching, then shift the flowers, and put fresh ones (the same quantity) for three days, and the powder will be well scented.

Powder of musked Roses.

To do this well, you must put the musked roses into the powder, and leave them there twenty four hours in a close box; so you must shift them three times, and they will give an excellent scent.

Powder of Orange Flowers.

Mix a pound of good scented flowers with twenty pounds of starch, or rice grounds, mingle them and sift them twice a day at least, for these are subject to heat, and in twenty four hours you may shift the flowers, and put the same quantity of fresh ones in, and so continue till there is a good scent. Keep it always close unless when you use it.

Powder of Violets or Iris.

In this case beat the iris, and pass it through a sieve; mingle it with the powder, and it gives the natural scent of a violet.

Powder of Amber.

Mix jessamine, rose, and musk powder together each a like quantity; then mingle with them the eighth part of an ounce of the essence of amber; then sift the powder, but break not the lumps made by the essence till dried, then sift them in, and mingle them well; and in this manner with flowers, essences, &c. you may make what scent you please. Starch being the ground of these hair powders, which sucks the scents and retains it a very considerable time for use.

*Washballs perfumed, &c.**To make common Washballs.*

Take a pound of white cake soap, scrape it, and beat it well in a mortar, take out the crumbles that are not well incorporated, and put in a pound of starch well powdered, an ounce of the
essence

essence of orange, half a pint of macanet water prepared, stir them gently with a pestle, then beat till they are all well mixed, make the paste up into balls, and let them dry.

Washballs of Neroli.

Take eight pounds of cake soap well cleansed, put to it when scraped, as much of rose or orange flower, as will temper it, stirring it twice a day, the better to soak; then having beaten it well, put in a pound of labdanum in powder, and two ounces of neroli; mix them into a paste, and so make them into balls.

Balgonia Washballs.

Take three bundles or boxes of these balls, beat them and dip them in angel water, as much as will well wet them, and half a pint of benjamin water, make two equal cakes of the paste, by well beating, then beat very small two drachms of musk or civet, with two ounces of balm of Peru, drop'd in by degrees; add to these the gross essence of amber, and some essence of cloves, and some cinnamon; mix these with the paste, make it into balls, and keep it for a very curious perfume; and in this nature other washballs or paste may be made, and perfumed with various scents, *Art's Treasure.*

Sweet Bags to make.

Take of common rose leaves twelve ounces, lavender flowers a pound and a half, sweet marjoram leaves twelve ounces, four ounces of the leaves of mirth, six ounces of thyme leaves, four ounces of mellilot leaves, one of rosemary, two of cloves, and one of musk roses, a good handful of citron and orange flowers; put them in a pot, making a ley of leaves and flowers, and a

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nother of salt, then stop it well, and every other day stir it with a stick, exposing it to the heat of the sun in summer, but not in the rain, and fill your sweet bags with these and powder.

*To perfume Gloves, Fans, or Skins, with
Flowers, &c.*

Grind on a smooth, clean marble stone, two drachms of civet, add three drops of the essence of orange flowers, and other flowers, made with ben oil, add more, a few drops of millefleur water, grind by itself gum adragant, about the bigness of a hazel nut mixed with orange flower water; after that mix your civet, dropping a little of the millefleur water; so do till all is well mixed, then put your composition into a mortar and pour more water, stir it till it comes to a quarter of a pint, lay it very even on your gloves, skins, &c. dry them in the air, open, and order them for colouring, and by this rule you may perfume them with any scents.

Roman Gloves, how to perfume.

Grind on a fine marble a drachm of civet, with a few drops of essence of orange flower water, then warm a little water and infuse in it a drachm of amber, with a few drops of orange flower water, pouring more to it by degrees, till all come to about a quarter of a pint; then mix again the civet with some drops of the same water, adding, till the whole comes to half a pint, and then perfume your gloves, skins, or fans with it.

How to colour and perfume Gloves at once.

Choose what colours you like best, and grind them on a flat stone, with a little ben oil, or the essence of orange flower water by degrees, still grinding; then put to the colours gum adragant
dissolved

dissolved in orange water; then being well ground pour all into an earthen pan with more water, taking the colours, being not too thick, and then dip a soft brush into it, and rub over gloves, skins or fans; let them dry in the air, then smooth and order them as is requisite; grind a bit of your colour with a little piece of gum adragant infused in orange flower water, and very clear, rub them over with this, and it will keep the scent a long time.

Several sorts of Snuff, solid and liquid, how to make and perfume them.

To prepare and cleanse Snuff.

The ground of it is tobacco dried into powder, that it will sift curiously through a fine sieve, and then it requires briefly to be washed and cleansed in the following manner.

Soak it in fair water twenty four hours, then take it out and squeeze it very well in a cloth, dry it in the sun in wicker hurdles, over which a fine linen cloth is laid, keeping it turning, and stirring almost continually; being dried, sprinkle sweet water on it, as orange, jessamine, angel, or the like, then dry it again, and wet and dry it three times, by which means it will be capable to the impression of any scents by being sprinkled on it, or infused; but if you design to colour it red or yellow, it must be done before it is scented, especially for flower scents, it may be coloured with red or yellow oaker.

To perfume Snuff with Flowers.

The flowers most uted in this, are jessamine, orange. musk roses, common roses, tuberoses, &c. But these if used naturally, must be help-
ed

ed with the essence of other flowers, or the same, to do this get a wooden box large enough for your purpose, lined within with dry white paper, lay a laying of snuff and a laying of flowers, and let them stand twenty four hours, then searce or sift the snuff, to take out the flowers, and renew them with other flowers; continue it four or five days, then separate it, and keep it in close boxes in a dry place for use.

Snuff with Spanish Perfume.

Take a pound of snuff that has been perfumed with any sort of flowers, beat in a mortar twenty grains of musk with a little lump of sugar, so put in your snuff by degrees, gently stirring it about, and when the mortar is full, empty it gently, and cover it to keep in the scent as much as may be; then put in ten grains of civet, put in the snuff again, and mingle them well, and so deep it dry for use.

How to take spots or Stains out of Scarlet or Velvet.

To do this, take soapwort, a herb of that name, bruse it and strain out the juice, add a little black soap, mix them well to a moderate thickness, daub over the stained or spotted place, wash it out with warm water, and suffering it to dry, do it again twice or thrice, and it will effect your desire.

To take Iron-Moulds or Spots out of Linnen.

Dissolve the powder of burnt allum in the juice of lemon, wet the place with it, and dry it with the back of a spoon in the forefront of which is a live coal, and in doing it five or six times, the iron mould or spot will wash out.

To

To recover faded Linen.

Heat a gallon of new milk over the fire, and scrape a pound of cake soap into it, and when the soap is well dissolved, boil the linen well therein, and then clap it into a hot laver of water and other soap, wash it out well, and it will recover its strength and colour.

To make Powder-inks, as the London Powder-ink, &c. and Liquid Shining Japan-ink.

To make that which is called the London Powder-ink.

Take ten ounces of the clearest nut galls, bruise them, and sift the powder very fine, then add white copperas two ounces, roman vitriol three ounces, gum arabick, or sandarick an ounce, bruise and sift them very fine, so that tho' they appear white, a little being put into water, will in a little time turn it, and an ounce of powder will make a pint of very black ink.

To make Japan or Shining Ink.

Take gum arabick and roman vitriol, of each an ounce, galls well bruised a pound, put them into rape vinegar, or vinegar made of clear small beer; let them remain in a warm place, often stirring till the liquor becomes black, then add to a gallon, an ounce of ivory black, and a quarter of a pint of seed lac varnish, and it will be curious black shining ink.

A Powder ink to rub on paper, and write on.

Bruise about twenty nut galls, and half an ounce of roman vitriol, as much gum arabick, and gum sandarick, mingle these finely together, when well bruised and sifted to a powder, rub the paper

paper hard with it, with cotton wool, and polishing it with a piece of ivory, write with water, and in a little time the letters you write will appear a fair black, as if written with the best ink.

Receipts for the Cures of sundry Diseases and Grievances incident to Men, Women and Childern.

For the Ague.

Take a little handful of the tops of rue, boil them in a quart of white wine, give the party half a pint four times successively, upon four cold fits approaching, if the ague last so long, and put the party into a warm bed: This must be drank as hot as the patient can drink it.

To ease and remove the pains of the Gout.

Take two ounces of sarsaparilla, cut it small, and boil it in a quart of small beer, till a third part be consumed, drink it as hot as may be, and about a quarter of an hour after, bathe it with your warm hands a mixture equally of the spirit of wine and the finest oil of turpentine, where the afflicting pain is, and it gives present ease, and in a short time makes it cease.

For Pains of the Teeth.

Take henbane-seed and hyssop-seed, bruise them finely together, mix them that they may stick well, with a little oil of spikenard, if hollow stop the tooth with these, and a piece of lint dipped in oil; if not tie up the quantity of a large pea in a fine thin rag, and lay it to the root of the tooth, and the pain will soon cease.

To take away Corns.

Cut well and close, take out as much of the
core

core as you can, then take burnt allum, and the
 both of an oyster that sticks to the shell, dried
 and powdered; incorporate these with a little Ve-
 nice turpentine; put into the hollownes, if there
 be any, a little tent of lint dipped in the oil of
 cloves, and lay on the other as plaister, and it,
 in a week's, time, with thrice renewing, takes a-
 way the corn, making flesh arise to fill the hol-
 lownes.

For Blasts, Burns or Scalds.

Take ointment of tobacco a quarter of an
 ounce, pigeons or pullets dung half an ounce,
 fallad oil two spoonfuls, snow water the like
 quantity, cream a quarter of a pint, and the
 white of a new laid egg, beat and bruise these
 till they become a pliable ointment over a gentle
 fire, spread them on a fair cloth, and lay it to
 the afflicted part, and in three or four times renew-
 ing it will take out the fire and put the party in
 an easy way of recovery.

For the Stone or Gravel in the Reins or Bladder.

Take green parslly, if it can be got; that is run-
 ning to seed; if not, other parslly, stamp it and
 squeeze out an ounce of the juice, and as much
 of that of a very hard onion; take a little handful
 of floses, bruise them that the stones may break,
 mix these with a pint of white wine, and boil it
 well, then add to the strained liquor a quarter of
 an ounce of calcined crabs eyes or claws and let
 the patient drink fasting half of it, and move up
 and down swiftly and within a quarrer of an
 hour the rest; and it will speedily afford ease,
 and bring away sand and gravel, if it remain in
 the ureters, or neck of the bladder or yard.

For

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For a Consumption.

Take a pint of the strippings of a red cow warm from her, and beat the yolk of an egg in it; and then sweeten it with sugar of roses, a spoonful of red rose water, and a little nutmeg scraped in. Drink it in the morning for a month; this cured one given over by the doctors.

For the Cramp.

Dry eel-skins, and wrap about your legs and thighs.

Cough or Cold.

Take a quart of ale, and put a handful of red sage into it, boil it to a pint, and put a quarter of a pound of treacle into it. Drink it warm going to bed.

Bruises inward.

Drink posset drink wherein comfrey root is boiled, or heat sack with saffron and treacle over the fire, and sweat in bed; and some time eat honey mixed with nutmeg and butter. Spruce beer is also very good for an inward bruise. Read more of these things in the *Way to get Wealth*, by making 23 sorts of wine; also to make china varnish, and black ground for japan work, to flack wood and gild, with divers other curious matters.

For the Jaundice.

Broth made of strawberry leaves and roots, eaten some days together cureth it. A Monk got great riches by it. Read more of these in a book called *A thousand Notable Things*, wherein are many choice receipts in physick, and to make all sorts of inks, dye bones, ivory, &c. make sealing wax, to make fine pictures and fashes for windows,

windows; with receipts for perfuming, gilding, dying, colouring, and on most subjects whatever.

Aches and Pains.

Ale sodd till as thick as Salve, applied there-to, marvellously cureth it; often proved.

Chopt Lips.

Rub chaps or rough lips with oil of almonds; and it will make them fine, smooth, and well coloured. Read a book called *The way to save Wealth*, by living well for two pence a day, and to save soap, shoes, candles; to write secretly, keep cloths from moths, dye reds, take spots out of linen and woollen, make verdigrease, sympathetick ink, white lead, soap, and many other curious matters.

Thus Reader, have I made good my promise in this crouded work, full of variety, and must now proceed to the Second Part,

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THE SECOND PART.

CHAP. I.

To make Glass of Crystal of all the several Colours, viz. Green, Gold, Yellow, Black, Garnet, Sapphire, Ruby, Amethyst, Crystal, Pearl, Turquoise, and many other Oriental Colours.

The Foundation of the Work for Glass making.

THE first thing to be considered in this, is the pulverine or Rochetta, which is the ashes of a certain herb growing in the Levant and Syria, making a whiter salt than barilla of Spain, and more excellent for fair and beautiful crystal.

To extract this salt, powder the ashes and sift them very fine; to know how these ashes prove, touch them with your tongue, to try the saltness or make an essay in a melting pot, to know if they bear much sand (or tarso) a thing useful in this art. Having tried your ashes, set up coppers with their furnaces in imitation of those used in dying, greater or lesser as the quantity of salt intended requires, fill them with fair water; let your fuel be dry wood, and when the water boils put in the pulverine, a quantity in proportion to your water, and boil it with a continued fire till a third part of the water be consumed, mixing them well

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well at bottom with a scummer, that the pulverine may well incorporate with the water, and all salt be extracted; then put in other fair water, and boil it till half be consumed, and so there will be a lee impregnated with the salt. To encrease the quantity of salt and have it whiter, boil in the water, before you put in the pulverine, 2 pounds of copper of tartar of red wine, calcined to a black colour only.

When two-thirds of the water are consumed in boiling, slacken the fire, season earthen pans with fair water six days, then put the lees into them with large brass ladles, as also the ice you find in the coppers, with the ashes; having filled the pans, let them stand ten days, and in that time the ashes will be at bottom, and the lee remain very clear, which must be taken gently off with brass ladles, that the bottom rise not; put it in other pans, and let it stand two days, that being purged from settlings, it may be more clear and limpid, which will be effectual when thrice settled; and so work till you have materials sufficient.

To strain the lees, and extract the salt, in the first place let the coppers be well washed with clear water, so fill them with the refined lees; let them boil gently, and put in the ice, till it thicken and shoot its salt, which usually happens about the beginning of 24 hours, so that on the top salt will appear like white threads or spiders webs; then sink a scummer full of holes to the bottom of the copper, and the salt will fall upon it, and now and then take it out, suffering the lees to run well off, but put the salt in tubs or earthen pans, that the ice may the better drain, save the liquor that drains from it to put in the copper, and dry the

salt; continue doing so till all the salt be got out of the copper; when the salt is well dried, put it into wooden vessels, which will suck up the moisture. Thus from 300 weight of ashes 80 or 90 pounds of salt may be got proper for this use; which being well dried, beat it, and put it into calcar (a sort of calcining furnace) to dry with a gentle heat: Rake it over with an iron rake when it is dry, take it out, pound it well, and sift it, that the biggest pieces exceed not grains of corn; when it is thus ordered, it must be kept clean from dust or other annoyances, to make frit of crystal, which is made in the following manner.

To make Frit of Crystal, or Bollito.

To make this, if you would have your crystal fair, procure the finest tarso (a kind of hard and white marble found in Tuscany) beat it small with an iron pestle in a mortar, sift it, and put 200wt. of it to about 130 of pulverine salt so ordered; mix them very well together, then put 'em into a calcar at first well heated for an hour, make a temperate fire, and rake the frit with an iron rake, that it may be well incorporated and calcin'd, then increase the fire, raking the frit for five hours, and raising the fire by degrees to a strong one; when tis sufficiently done, take out the frit, lay it on a floor, cover it with a cloth, and keeping all dust from it, it will be as white as snow; keep it then in a dry place, so that the salt dissolve not, for if it doth, and run from the tarso, 'twill not vitrify; if it stand three or four months it will be the better to put in pots, soon be clear, and fit to prepare a curious crystal glass.

To make common Glass.

Frit of pulverine makes an excellent white and
common

common fair glass. Frit of rochetta makes that between crystal and common glass; as much manganese well prepared must be used in common as crystal glass; and these, that you may have them the fairest, must once at least be put into water, and if you'd have them very fair, oftner, as you see convenient, so you may work them into what vessels you please. To make them whiter, let 'em be well calcined, that there may be the fewer blisters; and particularly observe, that if to each of them you put upon the frit the quantity of 12lb. of salt of tartar purified to 100 pounds of frit, the glass will be more pliable to work, and fairer than ordinary. Herein note, that you put in the salt of tartar when the frit is made, then mix the sand or tarso with the rochetta or pulverine well sifted, and make them of a frit as before.

How to purify Salt of Tartar for this Work.

Take the lumps of tartar of red wine, calcine it in earthen pots till it becomes black, its oily quality consumed, and it begins to turn white, but let it come to perfect whiteness, because then its salt will be haught; put it then into earthen pans filled with fair water heated also in glazed earthen pots; make it boil over a gentle fire, till a fourth part of the water be evaporated; then take it off to cool, and when the water is become clear, decant it into other vessels, so it will be a strong ice; then put into the pans more common water upon the remainder of the tartar, and let them boil as before, till the water becomes more brackish. This done, filter these waters, and impregnate with salt; put the filtered ice into glass bodies, to evaporate in the ashes of the furnace or a gentle heat, and in the bottom a

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white salt will remain, which dissolve in warm water, and when 'tis two days settled, evaporate it at a gentle heat in glass bodies, and there will be whiter salt remain at the bottom than the former; dissolve this again, and filter and evaporate after two days settling as before. Do this four times, and the salt will be as white as snow; which salt mixed with rochetta and pulverine, and a sufficient quantity of tarso, will make an excellent frit, that put in the pot, yields crystalline and common glass much fairer than what is made without this salt of tartar.

Having given you the ground work for white glass the best way, I come now to revive that excellent art,

Of colouring Glass, and first a curious Green.

To a pot of ten pounds of the metal of white glass put half of crystalline several times thro' water, and the other half common white metal of pulverine. Take four pounds of the common frit of pulverine, with this mix three pounds of red lead, unite them well together, and put them into a pot, and in a few hours they'll be purified, then cast the metal into water, take out the lead, and return the metal into the pot, let it purify 24 hours, at which time if you put in the colour, made chymically with the powder of the Caput Mortuum, of the spirit of Vitriolum Veneris, adding a small quantity of Crocus Martis, the colour will be perfected, and there arises a pleasant green, resembling the oriental emerald.

Another curious Green, fair and shining.

To do this, put crystalline into a pot that has not had maganese in it, and which has once or twice held water, to take out the saltiness, and to
it

it put half as much common or white metal made of pulverine, at several times, and when it is well mixed and purified, put to every 100 pounds, two pounds and a half of thrice calcined brass made in the arches of the furnace, with brass plates, and with this mix two ounces of calcin'd crocus martis, calcined with brimstone and reverberated. These powders being well mingled, put them to the metal, and if it has any blueness, add a little more crocus martis, and it will take it away; work it well with the metal according to art, and it will be a wonderful green of the burner.

A fair Sea green in a Crystal.

Put about 60 pounds of crystal frit in a pot well scumm'd, and not cast into the water; and to the metal put a pound and a half of the scales of brass that come off by hammering the fire; when you have well calcin'd them, put four ounces of well prepared zaffer. The powders being well mixed together before put into the crystal, put them in at four times, mixing the powders with the metal 2 hours, and then give it another mixture, as is usual in this work, making proof of it till the colour has taken. With half crystal and half rochetta, a beautiful sea green may be thus made.

A cheap Green.

Take the like quantity of zaffer and brass prepared as before, put them in the same manner and form to rochetta of the Levant, as also that of Spain, neither of them having had any maganese, but been well scummed, and not passed thro' water, using the rules as before in the green crystal, by this means it will receive a very fair colour, and be afforded at a very cheap rate.

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A Gold Yellow in Glass.

To do this, take rochetta frit one part, crystal frit two parts, being both made with tarso, mix 'em together, to every hundred weight take of tartar in lumps, beaten and sifted fine with maganese, each one pound; mix the powders by themselves first, then with the frit, so put them into the furnace, letting them stand four hours at an ordinary fire, by reason they will rise much; the metal being purified, and the colour well mixed with it, make it into what you think convenient for your use. In this case you must observe to put your colours in at several times, that the colour may take the better; you may heighten or lessen the colour the more or less you put in; but if you'd have a fair good colour, let the frit be all crystal.

Glass, a Garnet Colour.

Take a small quantity of rochetta and crystal frit, to every hundred add one pound of maganese, and an ounce of prepared zaffer; mix them well together before you put them to the frit; put them into the pot by degrees, and at the end of 24 hours, when it is well mixed, and of a pure colour, work it into form.

To make Glass of a Sapphire Colour.

Put a pound of zaffer to each hundred weight of rochetta frit; let the zaffer be well prepared, and to every pound of it, add an ounce of maganese; mix the powders well together by themselves, and then with the frit; put them so mixed into a furnace, there melt and purify them, and when pure and well coloured, work it, so the colour will be fine and durable.

To make Glass Colour of Amethyst.

Take crystal frit made of the finest tarso,
maganese

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manganese well prepared a pound, zaffer done the like one ounce and a half; first mix the powders well together by themselves, then with the frit, not with the metal in the pot. The proportion is a pound of frit to an ounce of powder. When it is pure coloured, work it as you please.

A Sapphire Colour, very fair.

Instead of rochetta, take crystal frit, add the same quantity of powder as the other sapphire, and order it the same way, and you'll have a fair shining sapphire coloured glass.

To make Glass of a very curious Black.

To do this, take the frit of crystal and pulverine twenty pounds each, calx of tin and lead four pounds; mix them well together, put them in a pot into a furnace well heated; the metal being pure take steel well calcin'd, and powder'd scales of iron falling from a smith's anvil, each an equal quantity; powder and mix them, and put six ounces of this to the metal, letting them boil slowly, often stirring it; let it settle 12 hours, and then work it, and it will be a fine velvet black, fit for all devices that require it.

To make Glass another fine Black.

Take of rochetta frit about two hundred pounds, to this put two pounds of tartar, and six of manganese, both powdered and well mixed, then put them leisurely into the furnace; when they are melted and purified, which will be at the end of four days, mix and wash the metal, and this makes a very curious black.

To make Glass a very deep Red.

Take 12 pounds of crystal frit, a pound of broken pieces of white glass, and two pounds of calcined tin; mix them together, and put them

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into a pot to run and purify, and when they are melted, take calcin'd steel, scales of iron falling from the anvil, of each a like quantity; grind them together, and when the metal is purified leisurely, put an ounce of these to it, so mix 'em well, and let them incorporate, which they'll easily do in five or six hours; but beware you put not in too much powder, for that will make the metal black, and it ought to be transparent, and not opacous, of an obscure yellow. When you find it so, forbear putting in any more powder, but put in three quarters of an ounce of brass calcined to redness; let it be well ground, and in three or four times using, it will be a blood red, for which reason make frequent essays to try the goodness of the colour; take it in the nick, or it loses its colour and turns black. That it may not do so, leave the mouth of the pot open. Let it not stand above ten hours in the furnace, suffering it to cool as little as possible. If you perceive the colour fade (as sometimes it does) put in some scales of iron to enliven it. As this is one of the nicest colours to be made, be careful in every thing, especially in adding steel and scales, as also in working it.

To make a Milk White Glass, called Lattimo.

To do this curiously, take crystal frit twelve pounds, calcined tin and lead two pounds, mix them together, and take maganese prepared half an ounce; let them stand 12 hours till well melted, and it becomes a fair white, very pleasant to the eye.

Another.

To do this, take about 400 weight of crystal frit, 60 pounds of tin calcined, two pounds and a half

a half of maganese prepared; powder them and mix them with the frit, then set them in a pot in the furnace; letting them refine 18 hours, and they will be purified; then cast it into water, purify it again in the furnace, so make an essay; if it be too clear, add 15 pounds more of calcined tin; mix it well with the metal, and in 24 hours it will become exceeding white, so work it. You may make this in like manner with rochetta frit, but not so white.

To make Glass, Peach Colour and White.

Work this as the fair milk-white or lattimo, only with a little maganese, and it will be of a peach bloom colour; but take the exact time to work it when in full colour, lest it loses it.

To make Marble-coloured Glass.

This is easily done, observing well the rule, which is, to put crystal frit in a pot, and when it is melted, before purified, work it, and it produces a fine marble colour.

To make Pearl colour.

Melt and purify crystal, put to it at three or four times tartar calcined to whiteness, or so often as on trial you find a crystal has taken pearl colour. Work it off speedily, lest the colour fades.

Frit of natural Crystal, &c.

To make this you must have natural crystal, calcine it in a crucible, extinguishing it eight times in fair water, covering it so close that no ashes or dirt get in; when the crystal is well calcined, dry and grind it to powder; mix this powder with salt of pulverine made into a glass body, so make frit with them, observing the quantities, rules, and proportion of magane.

as in other frit ; set it in the furnace, and often throw it into water to purify it. Work it as other crystal, and you'll make a curious matter of it.

To make Glass Blue, or Turquoise.

Take that sea salt called Black, or Gross Salt, put it into the calcar or purnello till the moisture be evaporated and it becomes white; beat it into a fine powder, put it into a pot of crystal metal dyed with the colour of sea green, made as I have directed ; put in the calcined salt by degrees, and mix it well with the metal, till the sea green loses its transparency, and takes opacity ; for the salt once vitrified, makes the metal lose its transparency, giving it a paleness by degrees increasing to a sky colour, or that of a turquoise stone: When it has taken this colour, it must be speedily work'd, or the salt will be lost by evaporation ; and if the colour be lost, you must begin your work again with fresh calcin'd salt. And now, before I go further in this art, known to but few, for the better understanding of the reader, I shall give a more particular account of things useful in many colours.

To prepare Zaffer.

Take this in gross pieces, let it stand 12 hours in the furnace in earthen pans, then put it into an iron ladle to be heated red hot in the furnace, so taking it thence, sprinkle it with sharp vinegar ; being cold, grind it on a fine porphyry stone, so wash it in glaz'd earthen vessels with water warmed, suffering the zaffer to settle at bottom, then decant gently off, and you'll take aside the dross, leaving the pure, and the tincture remains in the bottom. Being thus prepared and purified, 'twill be more excellent than at first, making a limpid

pid and clear tincture, which when well dried, may be kept in close vessels for use.

To prepare Maganese for colouring Glass.

Take that of Piedmont, as being the best of all others, put it into iron ladles, and in all the rest proceed as in the zaffer.

To make Ferretto of Spain to colour Glass.

To do this, calcine copper, that the metal being opened, may communicate its tincture to the glass, get thin plates of copper the bigness of a halfcrown, and have one or more goldsmiths melting pots; make a layer of brimstone powdered in the bottom of one of these, then a layer of plates, and over them another layer of powder; in this order fill the pot, which is otherwise said to make a SSS cover; lute it well, and dry the pot, then put it into an open wind furnace amidst burning coals; give it a strong fire for two hours, and when it is cold you will find the copper calcined. This copper beaten small, and searfed into fine powder must be kept for use.

To prepare Crocus Martis for colouring Glass.

This is no other than subtilizing and calcining of iron. To do it, take the filings of iron, or those of steel, which are better, mix them with three parts of powder of sulphur, put them into a melting pot, then into a furnace to calcine, and burn well off all the brimstone, so let it stand four hours in burning coals, then take and powder it: searfe the powder very fine, and put it into a crucible covered and luted at top, so set in the leer of the furnace, near the occhio or cavalet 15 days, or somewhat more, and it will be of a reddish colour inclining somewhat to purple. Keep it in a close vessel, to be used in glass colours, in which it is used with admirable success. To

To calcine Brass called Orpello, or Tremolante, making a curious Sea-green, or Sky-colour.

Take thin brass, and cut it in small pieces, put it into a crucible covered and luted at top, set it in a fierce fire, let it stand four days in a great but not melting fire, for if it melts your labour is lost; in that time 'twill be very well calcin'd, so powder it in the most subtile manner, searse it, and there will be a black powder, which spread on tiles and keep a leer on burning coal four days near to the round hole; take away the ashes that fall upon it, powder, and searse it again, and so keep it close stopt for use. To know if it be well calcined, put it into glass, and if it swells, 'tis right, if not 'tis not well calcined; or else 'tis over burned, and then it will not colour well.

To calcine Brass another way, to make a transparent Red.

Cut it small as the former, and put it into a melting pot, with layings of powder and brimstone, and metal, as in copper; first set it on kindled coals, then put it into a strong fire in the furnace, to calcine for 24 hours; then powder and searse it, put it covered into the furnace on tiles of earth, for 12 days, to reverberate; so powder, grind, and keep it for use; besides a red, it contributes principally to the making a yellow and chalcedony.

A Red Colour from Brass.

Put small pieces of it in the arches of the furnace, and let them be there close till they are well calcined, but in such a fire as they must not melt; and when calcined, powder the brass, and the powder will be red and excellent in many uses for colouring glass. Brass thrice calcined, is like-

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wife very excellent, and is ordered in the following manner.

Brass thrice calcined, to make a curious Colour in Glass.

Put this on the leer, or into the furnello of the furnace, near the occhio, into pans baked, or earthen tiles; calcine it for four days, and you will have a black powder, sticking together, beat it fine and searse it; calcine as before, but a day longer, and then it will not stick together, and be of a russet colour; and so the third time, but observe it be not too much nor too little calcined, for then it will not colour well; and to know when it is well, put it to purified metal it will make it boil and swell, and if it does not, it is too much or too little.

This makes a curious sea green, and an emerald green. The Arabian colour called turquois, a curious sky colour with other varieties. *Art's Treasure.*

CHAP. II.

To make Glass of Lead, of many beautiful Colours, resembling those of Oriental Precious Stones, as Emeralds, Topaz, and others; and the Materials useful in the Work.

The ground Work for making Glass of Lead.

THIS is a very curious Art, which but a few understand, especially as to the colours; tho' it may be held the noblest and fairest of all other glass, yet great caution must be used in making

making it; for being well made, it imitates the true oriental gems, which cannot so well be done in crystal or any other glass, yet you must use great diligence in melting it, lest all sorts of pots are broken in doing it, and so the metal run in the furnace; and the business chiefly consists in rightly knowing how to calcine lead, and to recalcine it a second time; for the more it is calcined the less it returns to lead, and less endangers your pots.

Observe also to cast the metal in water, and by that means separate the metal from the glass, even the last grains of it, but it must be done by little and little, that the separation may be made the better, for the least lead remaining, breaks out the bottom of the pot, and lets the metal fall out; and farther observe, that the pots and lead must not have too much heat in the furnace, neither must the metal be wrought too hot; and the marble wherein it is wrought must be of the hardest stone, and be wetted, or else it will break and scale.

A curious Way to calcine Lead.

At first calcine it in a kiln as potters use in a great quantity, for in two days they usually calcine three or four hundred weight. In calcining take particular care that the kiln be not too hot, but so that it may keep the lead in continual fusion, otherwise it will not be calcined. When it is well melted you will observe at the top a yellowish matter; then prepare to draw forward the calcined part with an iron suitable for that purpose, ever spreading it in the internal extremity of the kiln's bottom, which ought to be of soft stone that will bear the fire, and the kiln must have

have a declinative towards the mouth. When it is calcined, it must be put and spread a second time in the kiln, that in a convenient heat it may reverberate, keeping it stirring with the iron for several hours, till it comes to this second calcination to a good yellow, and be calcined; then finely searse it, and what passes not the searse, recalcine it with new lead.

To make Glass of Lead.

Take fifteen pounds of calcined lead, crystal rochetta, or pulverine frit, according as you would make the colours, twelve pounds; mix them exceeding well, and put them into a pot; let them stand ten hours, and then cast them into water, for in that time they'll be well melted: Separate the lead, and return the metal into the pot, which at the end of 12 hours will be fit to work.

How to work the Glass of Lead.

To work this into vessels, it will be necessary before it is taken upon the iron, to be a little raised in the pot; so take it out and suffer it to cool a little, then work it on the marble, being clear at first; let the stone be wet with cold water, that the glass may not draw away with it the marble and seale it, which without wetting it will, and so to the damage of it, incorporate it into itself; therefore you must continually wet it whilst the glass is wrought, otherwise, by the marble sticking in it, the fairness and beauty will be taken from it; do thus as often as you take the metal out of the pot.

This sort of glass is very tender, that if it be not cooled in the furnace, and taken a little at a time and held on the irons and the marble continually wetted, it is next to an impossibility to work it;

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it; which cause proceeds from the calcined lead, that renders it so very tender; yet when well wrought it is an excellent glass.

To make Glass of Lead, of an Emerald Colour.

Take twenty pounds of the frit of pulverine, sixteen pounds of calcined lead, searfed both into two powders, first by themselves; and when well mixed together, put them into a pot, not too hot, for eight or ten hours, and then they will be melted; so cast them into the water, and separate the lead and the unctuosity, which calcined lead and pulverine give it; and there will ensue a bright shining colour, and in a few hours it will run, and become very clear, then put into it brass thrice calcined six ounces, mixing with it a penny weight of crocus martis, made with vinegar, put in at six times. This mixture does always well, mixing the glass at least every two or three minutes, let it settle an hour, then mix, and take an essay thereof, when the colour is apt; then incorporate eight hours, and work it into vessels, or other devices.

Note, If you let it stand in a pot when it hath received its colour, till it hath consumed all the dregs, and is perfectly refined, it will be so like the natural emerald, that the sight can hardly distinguish one from another.

Another curious Green.

This is made in all respects as the foregoing green, with this addition, viz. That there must here be six ounces of Caput Mortuum, of Vitriolum Veneris, instead of the brass in the other.

This is the rarest green that can be made any way whatsoever.

A sky or Sea Gren, in glass of Lead.

Take sixteen pounds of the frit of crystal; ten pounds

pounds of calcined lead, mix and searse them well together; set them in the furnace twelve hours, and the stuff will be melted; then cast both it and the pot into water, separate the lead; then a second time let them stand eight hours in the furnace, again cast them into the water, separate the lead, and again put them into the furnace, and in eight hours more the metal will be very clear; then take of zaffer well prepared, a quarter of an ounce, calcined brasse four ounces, mix them well, and put them in at four times, in four equal quantities, and at the end of two hours, mix well the glass, and take an essay of it; then let it stand ten hours, in which time the colour will be well incorporated, the glass very well perfected, and be fit to be wrought in any works.

A Topaz Colour in Glass of Lead.

Take fifteen pounds of crystal frit, twelve pounds of calcined lead, mix and searse them well together; set them in the furnace, but not too hot; at the end of eight hours put them in water to separate the lead from the pot and glass; repeat this twice, and add half glass, of a gold yellow colour; let them incorporate and purify, and it will be of the colour of an oriental topaz.

Garnet Colour or Glass of Lead.

Take twenty pounds of crystal frit, and sixteen pounds of calcined lead, searse and put them into a pot, add to them of maganese three ounces, of zaffer half an ounce, both well prepared, and let them stand ten hours, cast them into water, and separate the lead, then put them again into the furnace, and let them purify ten hours, so mix them, and make an essay, and when it is perfected, and the colour of a fair garnet, work the metal into what form you think most convenient. To

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To make a Yellow Gold Colour on Glass of Lead.

Take calcined lead, and crystal frit, each sixteen pounds, mix and searse them, then add thrice calcined brass six ounces, crocus martis made with vinegar a penny weight; mix them well and put them into a furnace, and let them stand twelve hours, then cast them into water, to separate the lead, and put them again into the furnace, where let them stand other twelve hours, then the metal will be clear; so mix them and take an essay; and if it appear green, put in a little more crocus martis, which will take it away, and so it will become a fair yellow gold colour.

A Sapphire coloured Glass of Lead.

Take of crystal frit fifteen pounds, calcined lead twelve pounds, searse and well mix them together, so add to them a penny weight of maganese, and two ounces of zaffer, both well prepared, and let them stand twelve hours in the furnace; cast them into water, and separate the lead. Do the like a second time, and when the colour takes, it will be that of oriental sapphire, very fair, with the mixture of a double violet colour.

To colour natural Crystal of a Viper Colour, without melting.

Take crystal that is of a good water, fine and clear, in several pieces of different bigness, yellow orpiment, and crude mercury in powder, of each two ounces, sal-armoniack one ounce; let the three last, in fine powder, be well mixed together, and put them in a crucible that will well bear the fire, and upon them the crystal in pieces, so cover the crucible with another, mouth to mouth, and well luted. and when they are dry, set them on coals, which kindle by little and little, and being
fired,

fired, suffer them to flame of themselves, and then they will smoak much, therefore you must do it in a large chimney, to avoid the fumes which are hurtful, and when the fumes are evaporated, let the crystal stand till cold, by the going out of the fire of its own accord, so unlute the crucibles, and take out the crystal, and those on the top will be tinged with a curious yellow, a red ruby and balass colour, with fair spots and those at the bottom into the wavy colour of a viper, and will endure a good polishing, and contain a curious lustre.

A curious Lapis Lazuli Colour.

To do this, melt the most tender white crystal and lattimo in a pot, and when well melted put blue smalt, by little and little, and when the colour comes well, let it stand in the fire two hours, then make an essay of it, and when it is proof, let it, stand twelve hours; mix and work it, and if the metal rise, put in a piece of leaf gold, and it will allay it, and so you will have the natural colour of Lapis Lazuli.

To colour Natural Crystal like Rubies, Balass, Topaz, Gizasole, Opal, &c.

To do this, take orpiment of a yellow orange tawny, well powdered crystalline, white arsenick, crude antimony, and sal armoniack, of each two ounces, powder and mix them very well, and put them into a large crucible, and upon them pieces of crystal, of a fair water, without any spots; let the crystal be somewhat large, and fill the crucible, and lute on it another, mouth to mouth, making a hole at the bottom of the uppermost, as big as a straw, that the air may get in to evaporate the fumes. When the lute is dry set them
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in the coals, so that all the lowermost and the one half of the uppermost may be buried in the coals; so kindle the fire by degrees, and do as in preparing the other crystal, to avoid the fumes, which will be long; therefore keep a constant fire, very strong, and keep out all cold air, lest the crystal being brittle, break, and so well cooled as the other, the colour will appear.

To make Glass of Lead as red as Blood.

To do this, put into a pot six pounds of glass of lead, ten pounds of crystal frit, and when purified cast them into water; then return them into the pot, and when they are well refined, put in five or six ounces of copper calcined to a red powder, and let them boil up and refine; after that put in a little red tartar in powder, and let the metal boil up again, and well incorporate, and take an essay, and if the colour be not come up to a height, put it again to anneal, till it comes to its colour.

To recover the faded Colour of natural Turquois.

Put it into a glass, and pour on it the oil of sweet almonds, keep it warm, on temperate ashes, and in two days the natural colour will return very beautiful.

To make Vitriolum Veneris, used in colouring Glass; and in some places mentioned.

Set covered crucibles in an open wind furnace, with burning coals; let them stand two hours, then suffer the furnace to cool of itself, so take out the crucibles, and you will find the copper you have put in, calcined to a blackish or dark colour, or obscure purple, which powdered and well seared put into an earthen vessel that will bear the fire, set that in an open wind furnace, on

Cross iron bats, fill the pans with lighted coals, Put in the calcined copper, add to each pound six ounces of brimstone powdered, and when the brimstone begins to flame, keep it continually stirring till the brimstone is consumed and the smoak cease, then take it out hot; do this by renewing three times, and you'll have a curious powder fit for your purpose; for being infused in water, in a retort for many hours, and well luted, the curious settling being separated, it is excellent to mix (when dry) with zaffer; and put to crystal frit, maketh a beautiful sea green, and in many other cases an azure or curious sky-colour.

CHAP. III.

To make curious Enamels of divers Colours, after the best Manner, for Gold and Silver Works, and other Metals. To fix Sulphur, Extract Animæ Saturni, &c.

The Ground Work of Enamels.

TAKE thirty pounds of fine lead, thirty three pounds of fine tin, searse them when they are well calcined in a kiln, boil this calx a little in clean water in earthen vessels, and when you take it off decant the water by inclination, and in it will be the finer part of the calx; put fresh water on the remainder, boil and decant it as before, as long as the water carries off any calx, and then recalcine what remains gross, and draw off the most subtile part of it, as before; after that
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evaporate the water that carried off the finer calx over a gentle fire, that the calx may not fly out with it, but remain in the bottom; then take crystal frit made with tarso finely ground, and of this calx, of each fifty pounds, white salt of tartar eight ounces, powder, searse and well mix them; put the composition into a new earthen pot: giving it a fire for ten hours, then powder it, keeping it close covered in a dry place. Of these materials all the ground of enamels are made, of what colour soever.

Materials or Utensils for this Work.

In this curious work, which is in high esteem and very profitable, it will not be amiss to set down the materials or utensils to be used; and therefore, 1st, Let the pot wherein you make the enamels, be well glazed with white glass, and that it bear the fire well. 2dly, Incorporate, and mix well the stuff and colour of the enamels. 3dly, When it comes to be refined, and the colour proves good, and all well incorporated, take it off the fire with a pair of tongs for the workman's use.

The Way of making Enamel.

Powder, searse, and grind well the colours; having mixt them together as occasion requires, then with the stuff of the enamel, set them in pots in the furnace: being melted and incorporated, cast them into water, and when dry set them again in the furnace to melt, which will be soon so make an essay, and if the colour be too high, take out some of it, and add more of the stuff of the enamel; if too light, add more of the colour, till you bring it to a due proportion.

White

White Enamel.

Take six pounds of the stuff for enamel, 48 grains of maganese, cast it thrice into water; being refined, melt it, and it will produce a white enamel.

Turquois coloured Enamel,

Take six pounds of the stuff of enamel, melt, refine and cast it into water; then again set it in the furnace, and when it is melted, and well refined, put in three ounces of calcined brass, at thrice, 96 grains of prepared zaffer, and 48 of maganese likewise prepared; mix these well every time, and let them incorporate; make a proof with your eye as to the colour, and when you find it right, take it out and keep it for use.

A Green Enamel.

Take four pounds of the stuff for enamels, place it in the furnace, and in ten or twelve hours it will be melted and refined, so cast it into water, and place it again in the furnace in its own pot, and being refined, put in two ounces of brass thrice calcined, mix with two ounces of scales of iron well ground, put these in at three times, mixing and incorporating them well every time, and so work it up to a pure colour, and take it from the fire, &c.

To make violet coloured Enamel.

Take six pounds of the finest enamel stuff, three ounces of maganese well prepared, 48 grains of thrice calcined brass, mix the powders very well together, and then do the like with the enamel stuff; put them into the furnace, cast them into water, and being dry, put them again into the furnace, and when the stuff is refined and well coloured, make it up for use.

To make a sky coloured Enamel.

Take four pounds of enamel stuff, brass of sky colour and sea green each two ounces, prepared zaffer 48 grains, and mix them well; then in all things else use them as the former.

To make Purplish Enamel.

Take six pounds of the stuff for enamels, two ounces of maganese prepared, of brass thrice calcined, six ounces; mix them very well together, set them in the furnace, and in all things else use or order them as in the other.

To make Gold colour or yellow Enamel.

To make this take six pounds of enamel stuff, three ounces of tartar, 72 grains of maganese prepared, grind and mix the powders well together, and after that with the stuffs of the enamel, melt and order them as other enamels, and it will be of a fair golden yellow, proper to enamel on gold; but it will not shew so well there, unless it be worked on with other enamels, that will make pleasing variety of colours.

A black Enamel, to make it.

Take four pounds of the enamel stuff, maganese and zaffer prepared, each two ounces, mix them well together, and then incorporate them well with the stuff; put the pot with these materials into the furnace, let the pot be large, and when they are melted and refined, cast them into the water; then put them into the furnace again, and they will quickly refine, and become of a curious velvet black.

Another curious black Enamel.

Take four pounds of the enamel stuff, of tartar four ounces, well prepared maganese two ounces, mix and grind them well, and then mix them well with

With the enamel stuff, and in melting and refining, use them as other enamels.

A red enamel

Take of enamel stuff four pounds, put to it two ounces of maganese prepared, mix them well and set them in the furnace in a large pot, and being melted and refined, cast it in water, melt, refine, &c. again.

To make an Azure Enamel.

Take four pounds of enamel stuff, prepared zaffer two ounces, mix with it at first, of thrice calcined brass 48 grains, and when the powders are well mixed, mix them with the stuff, and so order them in melting and purifying as other enamels, the melting, &c. being all one in every case.

Another curious Green Enamel.

Take six pounds of stuff, mix with it three ounces of ferretto of Spain well ground, and 48 grains of crocus martis, and being well mixed, melt and purify them as the former enamels.

Another curious Green Enamel.

Take four pounds of enamel stuff, refine it well in a pot, in the furnace, then cast it into water, and put it into the pot and furnace again, so refine it; then put in at three times, thrice calcined brass two ounces, of crocus martis made with vinegar, 48 grains; then melt and refine them again, with incorporating the powders.

Another Black Enamel.

Take six pounds of enamel stuff, prepared zaffer, crocus martis made with vinegar, and of ferretto of Spain of each two ounces, grind and mix the powders well together, and then incorporate

them with the stuff, and order them in the fire and water, according to the usual rule.

A fair Red to Enamel Gold.

Take crystal frit, made of salt of pulverine, ten pounds, white tarso finely ground, eight pounds, make a substantial stuff with this frit and water, roll it into thin wafers, put them into an earthen pan, into a little furnace, made in the fashion of calcar, that they may be calcined about ten hours with a good fire, and for defect thereof, put them in the furnace, near the occhio, three or four days till they be calcined; take prepared calcined lead, and tin, and of tartar wine calcined, each two pounds, mix these well together; put them in a well glazed pot, glazed with white glass, and when melted, and pretty well refined, cast the metal into water; so melt and refine it again; then put in the red powder of calcined copper 12 ounces, and when the colour is well purified, add crocus martis made with aquafortis, put it in by degrees, and give it leave to settle six hours, make a proof to see if the colour is good, if not, heighten it with more crocus martis.

To fix Sulphur for this Work.

Boil the flower of brimstone an hour in common oil, and being taken off the fire, cast upon it strong vinegar, and the sulphur of a sudden will sink to the bottom, and the oil will be on the top of the vinegar, then empty the oil and vinegar; then put fresh oil on the sulphur; repeat this thrice, and then you will have a fixed sulphur proper for the work.

To extract Anima Saturni, useful in Enamel.

Put well ground litharge into an earthen glazed

zed pan, pour distilled vinegar upon it, let it be four fingers above it, and let it stand till the vinegar is of a milky colour; then decant it off, and put fresh vinegar upon the litharge; do this till the vinegar become no more coloured, then let the coloured vinegar stand in glazed pans, that the milky substance of the litharge may sink to the bottom; then decant off the clear vinegar, and the remainder milky substance is the Anima Saturni; and if in this case the white stuff precipitate not well, cast upon it cold water, which usually makes it fall to the bottom, and when it does not precipitate, evaporate the water and vinegar.

CHAP. IV.

The Art of making Calcedony like Jasper, Agates, and other lucid Stones, with their Clouds, Shadows, Spots, Waverings, and many other curious Embellishments; and to prepare the Materials useful in the Work.

TO make curious waverings, and other mixtures of colours that surpass the workings of nature in calcedony, &c. I shall lay down such perfect rules, as have not hitherto been distinctly known, (except to very few.) And

1. Put two pounds of aquafortis into a glass body, not very large, but with a long neck, and four ounces of fine silver, in fine small pieces very thin, set them in warm water, or near the fire, and as soon as the aquafortis heats, it will work and dissolve the silver; then take a pound of a-

quafortis, and in it dissolve five ounce of sal armoniack: Let it dissolve at a gentle heat, then put into the glass an ounce of saffer, and half an ounce of maganese, all well prepared; also half an ounce of ferretto of Spain, and a quarter of an ounce of crocus martis, calcined with brimstone, also thrice calcined copper, blue smalt, and red lead, each half an ounce, let them be finely powdered, and out one after another into the body, which stir so gently that the fortis may be incorporated with them, and for ten days keep the bottle close stopped, every day shaking it divers times; and so being well opened, put it into a furnace on sand, and make such a temperate heat, that in 24 hours all the aquafortis may be evaporated, then in the bottom there will remain a lion colour, which being reduced to fine powder, keep it in a strong glass vessel.

When you prepare to make a calcedony, put into a pot, broken crystal made into a clear metal, and white glass and crystalline which has been used, for with such frit as has not been wrought, it cannot be made; for the colours stick not to it, but are consumed by the fuit. To every pot of twenty pounds of glass, you must put two, or two ounces and a half of this powder, and sometimes three ounces; put it in at thrice, that it may the better mix and imbody; and in doing this certain blue fumes arise, and when it mixes, let your glass stand about an hour, then put in another mixture, and let it stand 24 hours, so it will be well mixed.

This done, essay it, and it will have a yellowish azure colour; this proof, many times returned into the furnace, and taken when it begins to cool, will

will shew divers wavey and very fair colours. After this, take eight ounces of tartar, foot of the chimney well vitrified, crocus martis calcined with brimstone halt an ounce, put it on by degrees, mixed in fine powder, at six times; taking a little interval between each putting in, mixing it with the glass, so that it may be well incorporated, and when all the powder is in, let the metal boil and purify 24 hours: Make of it a glass body, which put in the furnace many times; then try if it be enough, and there be blue toys on the outside, sea-green, red, yellow, and all colours with toys, and that it is illustrated with waves, such as calcedony, jaspers, or oriental agates have; and that to the sight, the body kept within, appears red as fire.

When this body is made and perfected, you may work it into vessels, variegated and new made, for they do not rise well; but he that works it must observe to pitch off well the glass, and anneal it sufficiently, that it may make waves and toys of the fairest colours; and afterwards you may work it at the wheel, for it takes polishing, and a very fine lustre as jewels.

If it happens that the colour fades, and the glass becomes transparent, then leave off working, and put to new tartar calcined, foot and crocus martis; for thus, as before, it takes a body and opacousness, and the colour by that means will appear; so let it purify many hours, that as it is usual, the powder newly put in, may be incorporated, then work it.

Another curious Way to make Calcedony, &c.

Dissolve three ounces of fine silver in a pound of aquafortis, cut small and thin, in a glass body, and so set it aside. In

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In the next place, put a pound of aquafortis in another glass, and dissolve it in five ounces of well purified mercury, and close the body well.

Put another pound of aquafortis into another little glass wherein are dissolved two ounces of sal armoniack, then put in crocus martis made with aquafortis, feretto of Spain, copper calcined into red powder, and brass calcined with sulphur, of each half an ounce, grind and well powder these materials by themselves, and put them in one by one into the body by degrees with leisure, because they all of them arise much.

In another little glass body let there be a pound of aquafortis, dissolve in it an ounce of sal armoniack, vitriol purified, crude antimony powdered, azure, or blue smalt, of each half an ounce, red lead an ounce, grind them well, and set them by in a vessel.

In another glass dissolve in a pound of aquafortis two ounces of sal armoniack, add an ounce of prepared zaffer, and a quarter of an ounce of prepared maganese; of cinnabar an ounce, and half an ounce of thrice calcined copper, put them warily in, well powdered every one by itself, that you may avoid the fumes that will arise.

In another glass put two ounces of sal armoniack to a pound of aquafortis, then add verdigrease, ceruse, red lake and scales of iron, each half an ounce, let all these bodies stand twelve days shaking every one of them six times every day, so the fortis will penetrate and subtilize the metal and ingredients, the better to communicate the tincture of the colour to the glass.

When this work is thus far brought to pass, take a great glass body well luted at the bottom, and

and empty in it all the materials of the other little bodies by degrees, that they may not make the glass crack or run out in this great body; to mix the waters, that the materials may be well incorporated, set it in the ashes at a very gentle heat, for too much heat wastes the powders, so that the fortis being evaporated, there will remain a redish powder at the bottom, which keep close in a glass vessel for use.

When you design to use it, put it into the metal of broken pieces of glass that have been used, doing now as in the former, giving the metal the same quantity of time, and use the distance; then add the body of burnt tartar, foot of the chimney vitrified, and crocus martis made with vinegar, suffer them then to settle 24 hours, and work it in all respects as the former, and it will produce wonders.

To make divers things useful in this Work; and first, to purify Vitriol, to make strong Aquafortis.

To do this take the best vitriol, and dissolve it in common warm water, let it stand three days till it is impregnated with salt; filtre and evaporate it in glass bodies till two-thirds of the water is consumed; put the remainder into earthen glazed vessels, set them 12 hours in a cold place, and the vitriol will shoot into pointed pieces, appearing like natural crystal of a fair emerald colour. Let this vitriol be dissolved again, do as before, and thrice repeat it; at each dissolving there will remain at the bottom a yellowish substance, which is unprofitable sulphur, and must be removed.

At the third time you will find the vitriol so purified, that it will make a strong aquafortis, particularly if the nitre be well refined.

A good

A good Way to burn Tartar.

Take tartar of red wine, in great pieces, full of spots, put it into new earthen pots, let it burn till it smoaks no more, in a pretty good fire, and being calcined, and in lumps of purplish colour, it is well calcined, and prepared for use.

Aqua Regis; how to make it for this Work.

To every pounds of aquafortis, made as before, put into a glass body two ounces of sal armoniack well powdered, set it in an earthen vessel of warm water, often stirring the aquafortis, which having dissolved, the sal armoniack will be tinged with a yellow colour, then put in more sal armoniack whilst the fortis will dissolve no more; then let it have a little settling, and when it is clear, decant it off very leisurely, and the unprofitable dross of the armoniack will remain in the bottom, and this Aqua Regis will be of force sufficient to dissolve gold and other metals, but it will not do the like by silver.

CHAP. V.

To prepare Materials, and make artificial Precious Stones in Imitation of the true ones; as Topaz, Emeralds, Chrysolites, Garnet, and other oriental Stones, of a very curious Lustre, differing from the True one only in hardness, as being of equal Beauty; and to colour Balls or Globes of Glass within side, &c.

The

*The Ground of this Work, in preparing
Natural Crystal.*

TAKE the clearest crystal you can get, free from spots, in pieces, put the pieces in crucibles covered at the top, and set them in hot burning coals, and when thoroughly heated put them into a large pan of cold water, and being cold, dry and re-calcine it; throw it into water, and so do successively 13 times, keeping all ashes and filth out of the crucible, and being sufficiently calcined, grind it to an impalpable powder, as fine as meal, on a porphyry stone with a muller of the same, grind about a spoonful at a time, and often searse it, till no roughness remains to be felt in the powder, lest it make the work dirty or imperfect; and this is the ground-work to mix with colours for making artificial jewels of paste, as will appear hereafter.

Materials useful in this Work.

Observe to lute well the pots wherein the crystal is calcined, and the pastes are baked, with good dry lute, before you either calcine or bake; and be sure to take pots that will well endure the fire, and in all respects keep a just proportion in the dose of the ingredients.

Always observe, before you bake the ingredients, to mix them very well, and if it fail to be thoroughly baked at first, you must do it again in a potter's furnace; and break not the pot till it is sufficiently done, for if you do, it will be full of blisters and foul.

Observe always to leave a vacancy of a finger's thickness on the top of the pot, particularly where it is held to swell much; for that you must put it with a care and leisure to prevent the materials running

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running into the fire; or if it stick to the cover, the colour will be foul. Having given you these rules or directions, I now proceed to teach the making several sorts of artificial jewels.

To imitate Topaz.

Take two ounces of prepared crystal, seven ounces of the ordinary minium, mix and bake them according to art, for a marvellous oriental Topaz colour; with which you may make what works you please.

A fair Emerald imitated.

Take two ounces of prepared crystal, six ounces of ordinary minium, mix these extremely well together, adding eighty grains of fine verdigrease well ground; mix and bake them, to work a fair emerald.

To make a Deep Emerald Colour.

To do this, take two ounces of prepared crystal, six ounces and a half of common red lead, mix them, and add of verdigrease about three penny weight, and 13 grains of crocus martis made with vinegar; mix them exceeding well together, and work it fit for baking: And to see when this, or other coloured pastes are baked enough, purified and transparent, take off only the cover made of lute, and if it be so to the bottom it is enough, if not you must presently relute, and bake it again, not breaking the pot, for the reasons before mentioned; and let the fire be continued with dry wood 24 hours, and so you will have a beautiful colour for small works, and to be set in gold.

But observe this emerald paste must have a more than ordinary baking, to consume the imperfection the lead brings upon it; and tho' it is somewhat

somewhat brittle, it is excellent, shining and transparent.

To imitate Oriental Chrysolites.

Take two ounces of crystal prepared, and eight of ordinary minium, and when they are well mixed put to them 12 grains of crocus martis made with vinegar; bake it more than ordinary, and it will come out very fair.

A Sky and Violet coloured PASTE.

Take prepared crystal two ounces, four ounces of ordinary minium, and add four grains of fine blue smalt, well mix them together, and when baked there will be a curious violet and fair sky colour.

Sapphires, to imitate in PASTE.

Take six ounces of ordinary minium, and two of crystal prepared; when well mixed, add five grains of prepared zaffer and the like of maganese, and mix and bake the paste well, and it will produce a curious sapphire colour.

To imitate Garnet in PASTE.

To do this, take six ounces of ordinary minium, two of prepared crystal; when these are well mixed put 16 grains of prepared maganese and three grains of zaffer; mix the paste well, and when it is baked it imitates a fair garnet.

How to make PASTE imitate Precious Stones.

To do this, take ceruse or white lead, grind it as fine as wheat flour, put it in a large glass body, put to it as much good vinegar as will cover it four fingers upward, putting it in by degrees till the fury and noise of it is over, so set it on a hot furnace in sand, that the eighth part of the vinegar may evaporate; take it away, let the body cool, so decant it leisurely, the vinegar being

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sufficiently coloured and impregnated with salt, put it aside in a glass vessel, and pour fresh vinegar on the remaining lead, let this vinegar be distilled, then decant it as before. Do this till the salt is taken from the lead, and that will appear when the vinegar will take no further colour, nor has any taste of sweetness, which generally happens after the sixth time of decanting. The work being thus far proceeded in, filtre the coloured vinegars when mixed together, so evaporate and dry them in a glass body, and at the bottom you'll find the salt of the ceruse of a white colour. Set this in a glass body in sand, being well luted from the neck downward, but let the mouth be open, and the heat of the furnace contracted for 24 hours; then take out the salt; if it be yellow, and not red it must stand 24 hours longer in the heat, and when it is of the colour of cinnabar 'tis enough; then make such a fire as may not melt it, for if it does, your labour is lost. Pour distilled vinegar on this calcined lead, repeating as before till you have extracted all the salt from it, and then separate the earthiness in part, or in the whole; keep this coloured vinegar in glazed earthen pans six days, that so all the imperfection may sink to the bottom; then put the vinegars into a glass body, and cover it, so after some time standing a white salt will be at bottom; then strain it, that the grosser part may remain, and cover the vinegar in a glass body, and at bottom you'll have a white salt as sweet as sugar, which you must dry well, which being dissolved in common fair water, let it stand in earthen glazed pans six days; then take away the sediment and filter and evaporate as before, so there will remain a salt as white as snow.

Do

Do this thrice in the same manner; and being thus prepared, 'tis known by the name of Saccharum Saturni, which put into a glass body in sand, and set in a furnace at a temperate heat for several days; when calcined, it will appear redder by far than cinnabar, and as subtile as the finest powder, and so it is called the true Sulphur of Saturn, purified from all earthiness.

When you would make paste for sapphires, emeralds, topaz, garnet, chrysolite, sly, or any different colour, take the same method as before, except that instead of ordinary red lead (where that occurs to any of them) you must take sulphur of Saturn, and so you may imitate jewels of exquisite beauty, which far surpass any yet mentioned, where ordinary lead is an ingredient.

How to colour Balls of Glass, or other white Glass within of curious Colours.

Take any orbicular glass that has a cavity, and season it with warm water, then infuse it in glass two days in fair water, put the infusion into a white pan, boil it till it be well mixed, then take it off, and while it is warm put it into a glass ball, &c. turn the glass about, that so it may wet and fasten every where within the glass, so let the moisture drain; then with a hollow tube or pipe blow powdered red lead into it in all parts, that it may run on the moisture, so wave it up and down, after that blue smalt, then powder of verdigrease very fine, with lake well ground, so that they may wave and intermix to make a curious colour; when they stick well take gesso powdered, put a good quantity of it into the ball, and so turn it about; then put out the superfluity, and the inside being dry, many curious colours will appear.

CHAP. VI.

To extract Lake, and other curious Colours, from Flowers, Herbs, Seeds, and other Things, for Painting, Limning, &c.

To extract Lake from red Roses, wild Poppies, red Violets, Flowers de luce, Orange, Borage, Carnation, or other Flowers.

TO do this take what quantity you please of the leaves of the flowers, which being bruised on a leaf of white paper, tinges it with its colour: You may assure yourself of success, but those herbs or flowers that do not so, are not serviceable in this way.

This experiment being made, put ordinary aqua vitæ into a glass body, the head as large as may be; and in the top put the leaves of such herbs, and flowers from which you would draw a tincture; then lute the joints of the head, and fit a receiver to it, so give it a temperate heat, that the more subtil part of the aqua vitæ ascending to the head, and falling on the flowers, may suck out the tincture, suffering it to do so, as long as it comes coloured; after that distil the coloured aqua vitæ in a glass vessel; which will be over white at its coming forth, and is fit for use in this nature at other times; and then the tincture remaining at the bottom must not be over-dried, but care taken that it may be moderately done; and so you may have the tincture of curious lake from all flowers and herbs fit for limning, and other beautiful works.

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yellow Lake, extracted from brown Buds, or other yellow Flowers that have a good Tincture, another Way.

Make a lee of lime and barilla tolerably strong, and in it over a gentle fire boil fresh broom flowers, having the full sap or substance in them. Order it so, that the lee may draw to it all the Tincture of the flowers, which will be known by their turning white, the lee being then as yellow as Theban wine: after that take out the flowers, and put the lee into glazed earthen dishes, set it to a moderate heat; after that let it boil by degrees, and put to it so much roach allum as may well dissolve with the fire. When it is well order'd put the ley into vessels of fair water, and the yellowness will settle at the bottom; so when the Tinctment is made, decant off the water and pour on that which is fresh, and when the tincture is sunk, order it as the former. Do this till the salt of the ley is quite taken out, as also the taste of the allum, and then the tincture of the flour will be the fairer, and so till the water runs out sweet, without any saltness, with the same taste as when it was put in; and then at the bottom you will find a curious beautiful lake for use, and whilst it is wet spread it upon a piece of white cloth, and dry it in shade upon new baked bricks, and keep it dry, and as much from the air as may be; and by these two ways at your discretion, you may extract colours from any flowers or herbs that have natural tinctures.

To make a curious Blue, or Sky.

Take three parts of the flour of brimstone, two of quicksilver, and eight parts of sal armoniac; grind these well on a porphyry stone, and
with

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with the quicksilver put them into a long necked glass, well luted at the bottom; set it in sand, and make a gentle fire till the moisture rises, then let the glass be stopped at the mouth, and encrease the fire as in sublimation, till the end; and a very illustrious fair blue will be the result of your labour.

To make that Embellishment called the mixture of the Spheres.

Take purified tin that is well purged, three pounds, copper well purified one pound; melt first the copper, then the tin, and being well mixed, cast upon them six ounces of tartar of red wine, only burnt, and of salt petre an ounce and a half, and two ounces of arsenick, and a quarter of an ounce of allum finely powdered; suffer them to evaporate, and then cast them into the form of a sphere, which metal may be curiously burnished and polished, and will shew rare in the mixture for spheres.

A Lake to be drawn from Cochineal.

Infuse in cold water a pound of the shearings of the finest woollen cloth a day, and so press it well to take away the oiliness of the wool; then in this manner allum the shearings, viz.

Take of roach allum four ounces, and two of crude tartar finely powdered, one of cochineal; put these into a little pipkin, with about four quarts of water, and when this begins to boil put in the flocks; let them boil over a gentle fire half an hour, so take them off, and suffer them to cool six hours, then take them out, and wash them well in fair water; and when the water is well soaked in them by standing two hours, press it out, and let the flocks dry. Evaporate the water,

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water, and at the bottom you'll find a sediment of a curious tincture, as also in the flocks.

Lake of Brazil and Madder.

In this case you must work each of them by themselves, but use not so much allum by an ounce as you did before, because the tincture of the cochineal is deeper than that of brazil and madder; wherefore give them their due proportion, which you will soon find by practice; and to one pound of flocks use more brazil or madder for weight. They have not so deep a tincture as cochineal has. Work in all points as in the former, and you will have a very fair lake.

Lake of Cochineal, another more easy Way.

Put a pound of roach allum powdered, into a bottle of aqua vitæ of the first running, and being well dissolved, put in an ounce of cochineal in powder finely sifted: Do as in the former, and put the materials in a glass body with a long neck, shake it often, that the aqua vitæ may be well tinctured, then let it stand four days, and so pour it into a clean glazed earthen pan; in common water dissolve four ounces of roach allum, put that to the coloured aqua vitæ in Hippocrates's sleeve, or a woollen bag, and for the rest order it as the other cochineal lake, and it will answer.

CHAP. VII.

The curious Art of painting Glass in various Figures and Colours in Oil, and annealing the Colours in a Furnace, to make them endure all Weathers.

Seeing all have not the convenience to make glass of divers colours in a solid body, 'twill

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be proper in this work to give an insight into the superficial colouring, or painting it with colours that shew fair on the outside, tho' they penetrate not. And in the first place I shall treat of the colours proper to be used in this Art, and so proceed to directions for using them.

For a fair Yellow.

Take a fine thin piece of good silver, dip it in melted brimstone, when it has laid there a while take it out with plyers, light it in the fire. and hold it till it has done burning; then beat it to powder in a brass mortar and grind it with gum arabick and a little oaker.

A Gold coloured Yellow.

Take a drachm of fine silver, antimony in powder two drachms, put them in a crucible in a very hot fire about half an hour, then cast it into a brass mortar, beat it to powder, and put to it six drachms of yellow oaker, old earth of rusty iron 7 drachms, grind 'em very fine for use.

To make a curious blue colour.

For this purpose take the clearest leads you can get, beat them in a mortar, get enamel of the same colour very transparent, grind each by itself, then take two parts of lead and enamel, so grind them together as you did the silver.

A fine Carnation Colour.

Take four drachms of jet, tin, or litharge of silver two drachms, gum and scales of iron, each one drachm, and of red chalk one ounce; grind these fine, and mix them well together.

A Velvet Black.

Take the scales of iron and jet, each a like quantity, mix them well together for use.

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Another curious Black.

To make this, take scales of copper and iron, each a drachm, heat them hot in a crucible, then take half a drachm of jet, grind them small, and temper them with gum-water.

A curious White.

Make this of crystal, ground as fine as meal, and tho' it be of natural white glass colour, it serves curiously to diaper it up, and for other uses.

A pleasant Green.

Take dried verdigrease, and grind it well with turpentine, put it into a glazed earthen pot, and when you use it, warm it so that it may run and spread well, and so be pliable for the work.

A fair Red Colour.

Powder sanguis draconis, and put to it rectified spirit of wine, and when it has been a while close covered, it will grow very tender; wring it out into an earthen glazed pot; take the fine liquid part for use.

Another Carnation, very pleasant.

Take jet three drachms, red oaker five ounces, tin-glass an ounce, gum two drachms; grind these well together, and you'll have a fair carnation.

The Manner and Way of Painting on Glass.

The manner of this is two fold, viz. In oil colours, and such colours as are afterward to be annealed and burnt on.

To lay Oil Colours,

To lay oil colours on glass, you must first grind them with gum-water, then temper them with Spanish turpentine, so lay them on according to art, in figures or otherwise, and let them dry by the fire, and the work is finished.

To anneal or burn colours on Glafs.

To do this, and make the colours abide well, you must have a four square brick furnace, a foot and a half broad, and as much in depth, lay five or six iron bars on the top of it, and raise the furnace about eight inches above the bars; then lay over the bars a plate of iron, and sift on it slacked lime, and upon the bed of lime, lay a row of glasses, then cover them with lime, and lay on another row of glasses, and so on, till the furnace be filled.

Lay likewise with every bed of glass a waste piece, that you may wipe over with any colour.

These are termed watches, and so when you think the glass is sufficiently burned, with a pair of plyers take out the lowermost and uppermost piece, or watch; lay it on a board, and when it is cold, use your endeavour to scrape off the colour; and if it hold well on those rows from whence you took them, they are sufficiently done, and will hold their colours against all weathers, and by this rule try all the rest, and prosper in your work.

CHAP. VIII.

The curious Art of Gilding divers sorts of metals with Leaf and Water-Gold, laying on Silver, &c.

To lay Gold upon Metals, Wood, &c.

GRIND red lead very fine, temper it with linseed oil, strike it gently and very thin over with a pencil; let the gold leaves be laid on very even, and when well dried, burnish the piece, and it will cast a curious lustre; and in this manner silver is laid on.

To lay Gold on glass

Take red lead and red chalk, of each a like quantity, grind them well together, and temper them with linseed oil, lay it on as the former, and when it is almost dry lay leaf gold on it exactly even, and being fully dry, polish it.

To gild Stone or Wood.

To do this neatly take oil of ben, and bole armoniack, of each a sufficient quantity, beat and grind them well together, and finely smear the wood or stone with it, and being almost dry, lay on leaf gold as before, and being well dried, polish it, and it will stick and shine gloriously.

To Gild that the Water shall not injure it.

Take calcined oaker, pumice-stone, of each a little quantity; add a little tartar, and beat them with linseed oil, then drop a few drops of fine varnish, strain these well mixed thro' a fine linen cloth, and so you may gild with it.

To gild Iron or Steel.

To do this take an ounce of tartar, three ounces of vermilion, bole armoniack and aqua vitz, each two ounces, grind these with linseed oil, and put to them half an ounce of lapis calaminaris, finely powdered, grind again with a few drops of varnish, and to take them off the stone; strain it, that it may be the thickness of treacle, and so strike it thin and gently over the metal, when warm, and when it is near dry, lay on your silver and gold, and burnish it.

A Water to gild Knives, Steel, Swords, &c.

Powder fire-stone, and put it into strong red wine vinegar; let it remain in it 24 hours, boil it in a gallon pot, putting in more vinegar as the other evaporates. Into this water dip the metal, and

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and at first it will be black, but being dried and well polished, under that blackness there will be a curious gold colour.

Another curious Way for Water-Gilding.

To do this, take of roach allum three pounds, roman vitriol three ounce, orpiment an ounce, verdigrease 24 grains, sal gem three ounces, and when these begin to boil in the water, put in of tartar and bay salt, each half an ounce, let them boil a considerable while, and then take off the vessel, and the iron being a little warm, strike it over with this liquor, and when it is dried before a gentle fire, burnish it, and you will have a curious lustre.

To gild Silver or Brass with Gold.

Take two ounces of quicksilver, put it into the fire in a crucible, and when it first smoaks, put into it an angel of fine gold; so immediately take it off, and the gold will be presently dissolved, and if it appear too thin, strain part of the quicksilver thro' fustian, then rub the quicksilver and gold on brass or silver, and it will stick to it; set the brass or silver on quick coals, till it begins to smook, scratch it with a brush, that the mercury may separate and evaporate, and leave the gold of a faint yellow; then heighten it with bole, sal armoniack and verdigrease, grind and temper it with water.

CHAP. XI.

A Treatise of Metals, in Tinging, Tincturing, and altering their Colours; hardening, softening, refining, melting, making Quicksilver malleable, and many other curious Matters.

To make Brass.

TO do this take three pounds of copper, one of lapis calaminaris in powder, melt them together for the space of an hour, and then put it out, and the copper will be transmuted into a fair shining brass.

To make Brass White.

Dilute in aquafortis about a penny weight of silver, put it in a vessel to the fire, till the silver turns to water; to which add as much powder of white tartar as will suck up the water; then make it into balls, rub any polished brass with this and it will take the colour of silver.

To make Copper of a gold colour.

Melt the copper, and put a little zink to it in fillings, and being incorporated it will be of a very shining gold colour.

To make Copper exceeding white.

To make this metal of a silver colour, take sublimate, sal armoniack. of each a like quantity, boil them in vinegar, in which quench the copper when taken red hot out of the furnace, and it will bear a lustre like silver.

To make Gold or Silver soft.

Take, sal armoniack, mercury sublimate, of each, a like quantity, melt the gold or silver, then put to it a little of this powder, and the metal will be soft.

To make quicksilver malleable.

When you have hardened your quicksilver, break the metal in small pieces, and boil it in sharp vinegar a quarter of an hour; put to it then a little sal armoniack, and digest it 10 or 12 days, so put all together in a luted cucurbit, and set it in the fire, till by degrees it becomes red hot,
and

and cracks little and little, then hang the mercury in a pot, with brimstone at the bottom; lute it well up, so set it in the fire, that it may grow hot by degrees, and receive the fume of the sulphur. Do this for a month once a day and the mercury will run, and endure the hammer on any occasion. Now to harden quicksilver for this work, put lead separate from its dross into a vessel, and when it cools thrust in a pointed stick, which soon take out again, so cast in the quicksilver, and it will congeal; then heat it in a mortar often, and it being hard melt it, and put it into fair water, after which use it.

To tinge Silver of a Gold Colour.

To do this, take fine gold and silver, good brass and copper, calcined with live sulphur, of each a like quantity, and it will appear to be gold of 18 carats fine.

To tinge Iron of a Brass Colour.

To do this, melt iron in a crucible, casting on it sulphur vivæ; then cast it into small rods and beat it into pieces, for by this means it will be very brittle, so put in aquafortis, dissolve it, and evaporate the menstruum, then with a strong fire reduce the powder into a body again, and it will be of a good brass colour, scarcely discernable from that made of copper.

To make Iron a Gold Colour.

Take the powder of allum, of melancy, and sea water, mix them till the powder is well dissolved, then heat a bar of iron red hot, and often quench it in this, and it will produce a gold tincture.

To make Iron a Silver Colour.

Take sal ammoniac in powder, and mix it with unslacked lime; put them in cold water, let them

them dissolve there, then heat the iron, and being, when red hot, quenched therein, it will be as white as silver.

To soften Steel, the better to Engrave on, &c.

Do this with a lixivium of oak, ash, and unslacked lime, by casting the steel into it, where it must remain about 14 days. Now to harden it again when the work you design is done upon it, quench it six or seven times in the blood of a hog, mixed with goose grease; at each time before you dip it again, dry it at the fire, and it will be very hard, but not brittle.

To tinge Lead of a Gold Colour.

Take lead that is well purged from the dross, one pound, an ounce of well powdered sal armoniack, half an ounce of salt petre, and 2 drachms of sal elbrot, put them into a crucible two days, in a gentle fire, and the lead will be thoroughly tinged.

To make tin that will not crack.

Take honey and salt, of each a like quantity, when they are mixed, melt your tin, and throw it when melted about 12 times into it, and so it will purge and leave off cracking.

If the tin thus used be put into a luted crucible, and calcined 24 hours, it will prove like calx of gold.

A Powder to make all Metal soft.

Take a quarter of a pound of antimony, axinginum, vitel, and salt, each a like quantity; make these into a powder, melt this powder with the metal, and it will effect your desire.

To make Metal melt with speed.

Put your metal into a crucible, with layings of brimstone, salt petre, and saw dust, and these taking

taking fire in a good heat, will soon cause the metal to run, and save you much labour.

To put a good temper on any edge Tool.

When you have made your edge tools of hard metal, heat them red hot in the fire, and dip them in cold water wherein soap has been dissolved; after that hold them on hot coals till the edges begin to grow yellowish, then drop tallow on them, and dip them in cold water, and the temper will be fitted very excellent for use.

To solder upon silver Brass or Iron.

For soft solder that runs soonest, take brass four penny weight, silver five penny weight, melt and mix them well together.

To separate Silver. from other Metal.

Melt a piece in a crucible and cast in some sulphur, and when the sulphur is consumed, it will carry away in its fumes the greater part of the dross, and that which continues will easily be separated from the silver, which will remain entire.

To gild Iron, &c. a curious Tinge.

Take three pints of spring water, two ounces of roach allum, an ounce of roman vitriol, two ounces of verdigrease, four ounces of sal gem, two ounces of orpiment; let them boil well, and then add some salt petre and tartar; let these boil up again, then take them off, and the metal being very warm, rub it well with this liquor, and it will set a curious burnish on it.

To dissolve Gold upon one's Hand.

To do this, distil the blood of a deer newly killed in balneo mariæ, soak the gold upon the lees three times, and the third time it will dissolve into little particles.

To

To make Copper very soft.

Melt burnt brass with storax in a crucible, quench it with linseed oil, so beat it on an anvil moderately, and boil it again, quench it as before, and do so five or six times, and when it is sufficiently softened, run it with copper, and it will make it as pliable as lead.

To make Iron or silver a Brass Colour.

Take flowers of brass, vitriol, and sal armoniack of each a like quantity, beat them into fine powder, and let them see the about half an hour in strong vinegar, then take off the vessel, putting in iron or silver, and covering it, and when it is cold take out the metal, and it will appear like fine brass, and be fit to be gilded.

To colour and soften Gold.

Dissolve verdigrease in vinegar, and strain it through a frit, then congeal, and when it begins to grow thick, put to it sal armoniack, and let it harden a considerable time, so melt the gold with it, and it will not only heighten the colour, but render it soft and very pliable.

CHAP. X.

A Miscellany or Mixture of Curiosities;
being rare Secrets, known but to few,
and highly profitable and pleasant.

To whiten Natural Pearl.

TO do this, take half an ounce of bean-flour, lime and eggs beaten together of an ounce water of codsoun, alcohol of wine, distil them and put the discoloured pearl into the distilled water, and they'll be a curious silver white.

To

To make Horn like Tortoise-shell.

Take a drachm of the litharge of gold, half an ounce of quicklime, mingle these well together, make them into a paste with white-wine, and of this make layings on horn that's thin on the sides. Being clear and dry, take it off after five or six hours: add tripoli and a little sallad oil to it, and when that has lain as long, rub it off with a linen cloth, so polish it, and the places where this has lain will be discoloured like tortoise.

To make a Walnut Grain on White Wood.

Thinly spread on it 7 or 8 lays of strong glue, one after another, each being first dried, and it will become shining; then wet a brush or pencil in common water, and form your knots or other strokes in the glue whilst warm, so strike hard on it with a wooden brush, and lay another laying of glue, and polish it.

To cement broken Glafs, a curious Way.

Take glair of eggs mixed with quick-lime, burnt flint (i. e. flint calcined to powder) and egg-shells; with these and gum-sandarack make a glue or cement, and anoint the broken edges of the glafs with it warm, as thin as may be; place the other pieces right and even on it, and let it cool, so let it lie in water an hour; take off the superfluous glue, and the glafs will be as firm as ever, and the cracks not be discerned, but with great difficulty, by a very clear light.

To make Sashes for Windows as clear as Glafs.

Take vellum, thin parchment, or the finest white paper, as smooth on the sides as may be, and being wet and stretched, put it on the sashes as straight as you can without tearing, then let it dry gently in the shade; take two parts of nut oil,

oil, or linseed oil, two parts of fair water, and a little white glass beaten to fine powder; boil them in a glass body in sand set on a tile pretty near the fire, till the water be consumed; then mix and strain it, and lay it on very thin with a fine brush, but so that it may soak thro' the paper; and they will be exceeding transparent.

To soften or dissolve Horn or Tortoise-shell.

Make a ley of the ashes of burnt bean-pods, strong vinegar, quicklime and tartar; put in the horn in thin pieces, and in 4 or 5 hours the horn will turn to a jelly, or be so soft that you may work it into what form you please with little labour. The like may be done with tortoise-shell, but it will not jelly; however, it will be so soft that it may in a manner be moulded like wax, and very pliable to make small boxes or watch-cases, and other things.

To soften Ivory, a curious Way.

Boil a good handful of sage leaves in thrice distilled vinegar, put in a little quicklime, and boil the ivory in it, and it will grow soft and tough, and not break but with great difficulty, when it is worked in the finest comb teeth, or other fine works.

To take Spots out of Ivory, and whiten it a new Way.

To do this, lay the ivory in quicklime, and pour first a sprinkling of vinegar, and then water, but not too much, that the heat may not be too great, to make it scale or grow brittle; and when it has lain 24 hours, take it out, wash it with white wine, rub and and polish it, and it will be marvellous white.—Read Art's Treasure.

To melt Amber for divers Uses.

Take amber that is not brittle, put in pieces
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in juice of citron, or strong vinegar, so that it may swim about an inch or two in the vessel you put it into; and so let it over a gentle fire, and let it heat and simmer till it boil up; then see when the amber grows soft or dissolves, and put it to the use designed.

To make artificial Ambergrease.

Take florence orris roots and white starch, of each an ounce, asphaltum, or bitumen, half an ounce, sperma ceti an ounce, ben nuts an ounce, musk a drachm, gum Tragacanth as much as will bind it close together, when well incorporated to make up.

To work these, observe that in the first place you make a paste of the benjamin, starch, and sperma ceti; this done, take one part and make up half the asphaltum; the other part make into a black paste, with all the ingredients; then join and temper them well with your hand.

To make Light for Lamps that will not smok.

To do this, distil a quart of good olive oil, and make the wick of talk, or stone allum, like other wicks; which is to be done by steeping them well in water, and they will spin out: and to make the oil rise, make a great many little holes with a fine awl or needle in the wick, and it will give a bright and curious steady light without smoaking.

To make a Candle not to be put out by any Wind.

To do this; fill a small pliable reed, or wheat straw with natural live sulphur, wrap it about with fine lint or cotton, cover it about with wax, and make it in the form of a candle; and then if the wind happens to blow it out, the snuff touching the sulphur, will immediately light it again, to great admiration.

To hinder any oil that is to burn, from smoaking.

To bring this about, distil the juice of onions, and put a little of it at the bottom of the lamp, or whatever you burn it in; and the oil swimming on the top, the strength of the distilled liquor underneath penetrating, it will hinder it from smoaking, and make it burn the brighter.

To put a curious White on Alabaster, and white Marble.

To do this, beat pumice stone into fine powder, and for 11 hours or thereabouts, infuse it in verjuice; then dip a sponge in it, and rub the stone well with it pretty warm, then wash it with a woollen cloth dipped in fair water, and so dry it with another woollen cloth, and polish it, and it will be an admirable shining white.

To make shining Japan, or China Ink.

Take an ounce of lamp black, 2 drachms of indigo, half a drachm of peach black, one drachm of black endive burnt; beat them into a fine powder, and then with a moiety of fig leaf water, and another part of milk, and a very little gum arabick, and when they are well mixed, make them up for use; but before you use the lamp black in this work, clarify it in an earthen pipkin, to take out the dross.

To make yellow Amber White.

This is a rare secret, and profitable to be put into practice. To do it, take a pound of yellow amber, and put it into a very strong cucurbit of earth, add to it two pounds of sal gem, or bay salt, pour upon them the like quantity of clear spring water, or as much as will serve to dissolve the salt; that being done, pour on some river water, and boil them all together, in an alembick
for

for the space of four hours, without a neck, and the amber will be of a delicate white shining colour, when polished.

To cast Horn in Moulds like Lead.

Take ashes of wine lees, burned and unslacked lime, and make a strong lee, put into it the scrapings or thin shavings of horn, and let them boil till the horn becomes as pap or jelly, then mix with it such colours as you would have the horn be of, and cast it into what mould or figure you would have it represent; when it is cold it will harden like glue, and be of an entire piece, and retain the colour very well. And thus you may cast the figures of flowers, beasts, birds, or any other thing in horn.

To make a Stone that shall take Fire and burn of itself, if wet with your Finger.

Take a loadstone that will draw iron well to it on the one side, and put it away on the other side; put it in a leaded pot; put to it four pounds of pitch, and one pound of brimstone; lute and well clay your pot, and set it in a furnace, giving it a gentle fire the space of one day and a night, augmenting the fire the second day, and the third day more, whilst the stone is on fire, and when it is well burnt, cool it again and cleanse it; so when at any time you wet it, that part will appear on fire, to the admiration of the beholders.

CHAP. XI.

Instructions how to cast Figures in Wax, Plaister, Paste, Metal, &c. Leaves, Flower, medals and other rare Curiosities worthy of Note.

How to cast the Figures of various Sorts of Animals.

WHEN you have the figure ready to mould, then oil it, and take off the hollow mould, in plaister, after this manner, viz.

Having well oiled it, lay it on potters earth, and make choice of those parts of it you think are most convenient to take off, and there make an edging or border of the like earth; this done, cast your plaister, well tempered, not too thick nor too thin; that part being well baked, gently lift it up in as few pieces as you can; repair the edges, and make little notches with a knife, the edge being oiled, and so put them exactly together again; after this manner a border or edging of the same earth, in the place whence you took the part of your figure, which done cast your plaister as before, and so lift up your piece to repair it; then putting it into its place, continue thus till all be done, which well dried, dress the outside of the mould with a flat smooth piece of iron; and when well hardened, mark the pieces one after another, then let them leisurely dry, and join and tie them together with a small cord, and so you have a compleat hollow mould of plaister, which as the pieces are more or less difficult, may accordingly be made of more or less pieces, from three to twelve, &c.

How

How to cast a hollow Figure, &c.

Supple the inside of your mould of paste, till no more oil will be taken in ; then with cotton wool dry it, and tie all the pieces together with small cord ; then seek a convenient mouth or casting place, and so melt your wax, made tough with a little fine turpentine, and when it is neither too hot nor too cold, run it into the mould ; if your figure be but little, fill it, and after a small time take out the stopple of the mouth, and suddenly turn the figure upside down, that the remaining wax may run out : and when you perceive it is sufficiently cold, open it, and you will have a hollow wax figure. If you find it too thin, let the next remain longer in the mould ; if too thick, pour out what remains sooner, and these figures, when repaired and polished, you may paint to any lively colour.

How to put an inward Mould or Kernel into any Waxen Figure.

If your figure be of a living creature, with a moderately hot knife divide it into two parts, lengthways or crossways ; then take potter's earth mixed with a little fine charcoal dust, moistening and beating them with a little iron rod, till all is well incorporated and as soft as paste, and with this paste fill the inside of the waxen figure ; which dry, cover the outside of each piece where they are to be joined with the like earth, very thin and moist, but beware it run not over the edges of the wax, and having joined it, repair it with a thin piece of copper or iron warm upon the joint ;

joint; then making a git or casting hole in the most convenient place, and let it be long enough with breath holes. If you conceive any part of the figure to which the metal will not easily pass, then roll up little pieces of wax about the thickness of a goose quill, or according to the size of the figure, which with a heated instrument stick to some part of it, that the end may reach the place suspected, where the metal will not easily run, and there fasten it; then take little tags, or iron about that bigness, about half a finger long, proportionable to the thickness of the wax of the innermost mould, and thrust these quite thro' the figure, to the purpose that the kernel, being in all parts supported, it may not touch or join to any part of the outward mould.

To make the Cases or Facing, &c.

Take founders earth, very fine, and steep it in a vessel of earth, filled with fair water, and by inclination pour it into another, that the drossy part may remain behind; then add to it some bone, mix them well together, and with a large pencil give a smooth laying of the earth on the waxed figure; dry it, and do so six times, and when it has had the last drying, strengthen it with potters clay, well mixed and beaten with hair, and that being dry, put your mould over the fire, on iron rods, in form of a gridiron; but beware the wax boil not within the mould, lest it break it; lean it then on one side, that the wax may all run clear out at the casting mouth; then heat your figure over a gentle fire, till it be well hardened, and melt the metal you intend to cast

the figure into, in a good heat, and have two crucibles in the fire, one empty to pour the metal into, that the dross and scum may not remain in it, and when it is at a proper heat, set the mould fast in sand, pour in the metal, and let it thoroughly cool; so by breaking your mould, you will have a perfect figure without seam; but if the figure be large, you must bind the mould with nealed wire, lest the weight strain and flaw it.

To cast Medals very lively.

To do this, calcine speculum, or spand in a crucible, then put it into a vessel of earth, and pour water on it; and when you have well stirred it, add as much more water, and being settled take it out, and make it into balls; then a second time calcine it, and beat it into powder, sprinkle some vinegar on it, and by that means make it into a paste; then a third time calcine it, and when cold beat it to powder, and searse it very fine, adding an ounce of sal armoniack dissolved in water, to twelve ounces of speculum; keep it then in a cellar, and with it make your moulds, or otherways frame your medals of it, moistening it; also with crocus martis, or saffron of iron, may be made another spand, in which you may cast the finest hair imaginable.

To cast Laurel Branches, Flowers, Vine Leaves, and the like curious Things.

To do this, make a circle of earth like a box, to the bigness of the thing you intend to cast, and imitate such branches, leaves, and flowers, as
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are of a good substance; for if too thin, the metal will not without great difficulty run; and when you have chose what you design. run a needle with a thread at the end of the stalk of the flower or leaf, and so thro' the middle of it, fastening the one end of the thread to the bottom of the circle, and the other to a stick that is to support over against it in a perpendicular line, that your flower or leaf touch not the sides of the circle; but before you fasten either, put a little piece of wax at the end of the stalk for a git hole, which must touch the bottom where the thread was fastened. Having done this, cast a composition of plaister of brick and plume, with sal armoniack water; and when it is well mixed, very fine and dry, bake it till the flower be wholly consumed that it encompasses, and has taken the impression off; and being almost cold, run into it tin, silver, or other metal; if tin, you may put a third part lead; or if silver, a little copper; and you will find the leaves or flowers very curiously taken in the metal, take them out by little and little, breaking off the mould; and after this manner you may cast all reptiles or creeping things.

To mould off Figures in paste.

Take the crumb of a new-drawn white loaf, mould it till it becomes as close as wax, and very pliable; then beat it and rub it with a rolling pin, as fine and far as it will go; then print it on the moulds, and when it has taken the suitable figure you desire, dry it in a stove, and it will be very hard; and so preserve this from

vermin, you may mix a little powder of aloes with it.

To mould small Figures of Jasper colour.

Oil your moulds with a fine pencil, and diversify them with such colours as you please, with gum tragacanth, if they spread or run, put a little of the gall of an ox, for the thicker the harder it will prove; then mould your paste of the colour of jasper, or the like; put it in to fill the mould, tie it with a wire, and take it out, repair and varnish it, and set it to harden.

Red Marble or Porphyry to counterfeit.

Take English brown, if it seem too reddish put some umber or soot; then take a very smooth board, a well polished marble, or a large piece of glass a little oiled: Then take some English brown, with some roset or lake, and grind them with gum tragacanth, then with a large brush flurt or sprinkle the glass according to the marks and veins of the stone. When it is enough spotted, let it dry; then temper your English brown and umber with gum tragacanth water into a paste; which being laid on the spotted glass or marble, let it dry, and polish it.

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CONCERNING

THE

LOADSTONE.

Of the Loadstone.

THE loadstone is a very hard and very heavy stone, the colour of which approaches commonly to that of iron, which it attracts by a peculiar virtue at a reasonable distance, and that with a force that makes a sensible resistance when you go to part them. This admirable stone has many fine properties, which I am now briefly to hint at.

The loadstone has not only the virtue of attracting iron even by penetrating the intervening bodies; but likewise that of communicating to the iron, which in like manner acquires the power of attracting another: For we see with our eyes, that an iron ring touched by a good loadstone, lifts another ring, and that second ring lifts a third, and so on. We see likewise, that a blade of a knife touched by a loadstone, raises needles, and iron or steel nails.

If you lay several sewing needles close to one another upon a table, and bring a loadstone near the first, it will attract the first, which acquiring a magnetic virtue, will draw the second, and that

the next, and so on, till all the needles hang to one another, as if they were linked together, unless you part them by violence.

Iron reciprocally attracts the loadstone at a reasonable distance, when that stone can move freely, as when it is hung up, or floats in water; notwithstanding the intervention of another body. For example, put a piece of loadstone in a light boat made like a Gondola, so as to make the loadstone float upon the water, and present to it a piece of iron at a reasonable distance, you'll see the Gondola cut the water to go and join the iron.

This puts me in mind of a clock I once saw at Lyons in Mr. Servicres's closet, which shewed the hours by throwing an artificial frog into a basin of water, round which the hours were marked, as upon a dial; for the frog swimming upon the water, stopped and pointed to the respective hour, and insensibly followed the hour of the day like the hand of a clock. I judge this was done by a Loadstone hid under the basin, which followed the hour of the day by the virtue of clock wheels, and drew to the same hour the frog, in which no question, was hid a piece of iron.

When a loadstone floats upon the water, without any thing about it to cramp its free motion, or hinder it to take what situation it finds most convenient, it turns always the same way with respect to south and north; so that one particular part of the stone always looks to the north, and its opposite to the south; whence these two places pointing to the two poles of the world, are called the Poles of the loadstone; and the straight line passing from one pole to the other, is called
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the Axis of the loadstone. Now, all the force and efficacy of the loadstone is in this axis, for the other parts off, the axes have very little virtue; and it is chiefly from the two extremities or poles, as from two centers, that the virtue is distributed.

That part which is equally remote from its two poles, we call the Equator of the loadstone; and this has such a quality, that if you lay a sewing needle upon it, 'twill lie all along it, parallel to its axis; but if you take it off of that line, it rises more and more as it approaches to one of the two poles, where it stands upright. This is distinctly observed in the spherical loadstones, which I here suppose homogeneous, as they commonly are, for otherwise they may have more than two poles. I know a gentleman at Lyons, who has a loadstone that has four poles, two on the south side, lying opposite one to another, and two after the same manner pointing to the north.

The loadstone communicates its virtue not only to the iron that it touches, but even to that which passes near it; attracts likewise another loadstone, and sometimes repulses it, according to the different aspects of their poles, which are called Friendly Poles when they are of a different denomination, that is, the one meridional, the other septentrional; and Hostile poles, when they are of the same denomination, that is, both meridional, or both septentrional. For the north pole of one loadstone, attracts the south, and repels the north pole of another, and contra; provided the other can move freely, as when it floats upon water; when the poles are friendly, it draws it indeed to a certain distance, but repels it if it comes nearer.

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We observe in all loadstones, that when the north pole of one has attracted the south pole of another, the aspect of the north pole of a third parts them. Here I purposely wave the reasons of these phenomena, because they are abstruse, and improper for recreation.

When we say, a loadstone in attracting iron penetrates all sorts of intervening bodies, as freely as if there were none between; we must except the intervention of iron itself; for we find by experience, that the intervention of a plate of iron impairs the activity of the magnetick force; doubtless because the virtue taking hold of the plate, is partly spent upon it.

When we say, that the loadstone draws iron to it, we must suppose that it can draw it; for if it cannot, and if it is at liberty to move, the iron reciprocally attracts it, and when joined together they sensibly resist the efforts of separation.

Tho' the magnetick virtue penetrates all intervening bodies, iron excepted, with as much facility as if nothing intervened, yet it is observable that this virtue is communicated with more difficulty thro' flesh, than thro' any metal, whatsoever.

When we say, that the blade of a knife acquires the magnetick virtue by being touched with a loadstone, we must add, that this virtue is communicated to the part of the knife that is last touched; so that if you rub the blade of a knife from the hilt to the point along a loadstone, all the magnetick virtue will remain in the point, and the other end towards the hilt will have no attractive force; and if you rub it the contrary way, the virtue will be transplanted to the other end.

end. Farther, the virtue thus imparted will be greater or less, according to the place of the loadstone that the blade is rubbed upon ; so that if you rub it upon one of the poles where the virtue is most effacious, it will receive the greatest attractive force that it is capable of.

All loadstones are not equally good ; and we must not always judge of the goodness of them by their weight ; for sometimes an ounce of loadstone is able to lift a pound of iron ; tho' indeed of two loadstones of equal vigour, the greater has always more force than the less. The more solid, and less porous that the stone is, the greater is the force ; and it has more vigour when polished than when rough, and more vigour when armed, with a plate of steel or polished iron. But here you must observe that if a loadstone thus armed, holds iron by one of its poles, and the friendly pole of another naked or unarmed loadstone is presented to it, it holds it the more forcibly ; but upon the presenting of the hostile pole it loses the force and lets it drop. In breaking a loadstone, you may find one part of it to have more force than the whole stone.

The loadstone attracts twice as much steel as iron, and at a greater distance ; for the former being solider and less porous than the latter, it joins more intimately with the former ; and when thus joined with fine well polished steel, it attracts a greater weight, than when fastened to gross unpolished iron. A stronger loadstone draws a great weight, with more expedition, and at a greater distance, than a weaker stone. We seldom see a large loadstone raise more than its own weight, unless it be armed ; but oftentimes we meet

meet with little ones, that raise ten, twelve, and sometimes eighteen times their own weight ; thus an ounce stone, will raise a pound of iron, as above.

We sometime observe with astonishment, that a large fine loadstone strips a little one that comes too near it of its virtue ; but the little one recovers it again in two or three days. We observe likewise in breaking off a part of a stone, the axis and the two poles shift their places. Father Schott the Jesuit tells you, that if you cut a loadstone by its equator into two parts, each part will have two poles, a new pole at the section, and the old one at the old place, bearing the same name ; and if you cut it in two by its axis, each part acquires new poles, of a similar situation to that of the poles of the first stone, and likewise with the same properties.

This stone is so hard, that scarce any iron instrument will touch it, and it cannot be cut but with a brass saw without teeth, made as sharp as a knife, and with the powder of emery diluted in water ; it being impossible to cut it with any other saw tho' of the finest steel.

I forgot to acquaint you, that by the north pole of a loadstone, we understand that pole which turns or points to the north, when the stone hangs free by its equator ; and by the south pole the opposite pole that points to the south. I said, when it hangs free by its equator, for if it was suspended by one of its two poles, it would continue unmovable, because the north pole could not then turn to the north, nor the south pole to the south.

Some will have the loadstone to be called in latin

latin Magnes, from Magnesia, a country in Macedonia, where it is frequently found. Now, the Magnesia loadstone is sometimes black, sometimes red; the Natolia loadstone is white; but, as historians tell us, neither of these has much virtue. The Ethiopian loadstone, which is very heavy, and very vigorous, is sometimes yellow. The best loadstones we have in Europe, are for the most part found in Norway. There is a sort of red, and of blue loadstone, which Dioscorides prefers to that of the rusty colour. In Italy they have a sort of loadstone, that is red on the outside, and blue within, which when beaten gives a sort of flour, that iron attracts at a certain distance.

If the name of loadstone be allowed to the stones that attract other metals we may reckon in this list, a stone called Pantarbe, which attracts gold, and another called Andromantie, which attracts silver. Carden says, there is a stone called Calamites, that attracts flesh. In Ethiopia there is a stone called Theamedes, that instead of loving iron cannot endure it, and repels it; which has given some occasion to say, that as those who carry iron about them to the loadstone mountains cannot stir, so on the other hand, if these mountains produced the Theamedes, they could not keep to a fixed station.

To conclude this problem, the best loadstones are commonly those of a watery, or of a shining black colour, and very little red; and of a solid homogeneous substance, that is, they have but few pores, and are free from the mixture of a foreign matter. The figure of a loadstone contributes very much to its force, for it is a standing

APPENDIX

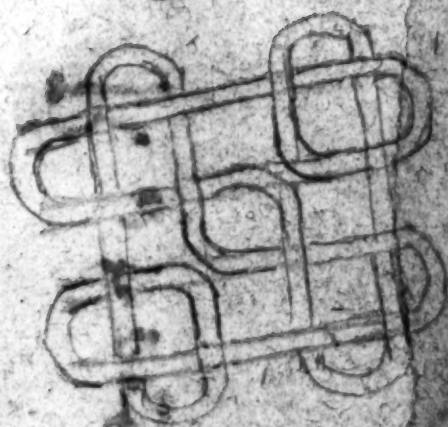
ing truth. that of all loadstones of equal goodness, that which is the longest, the best polished, and so cut, that its two poles are the two extremities, is the most vigorous. A spherical figure is likewise very advantageous to a loadstone.

The loadstone preserves its virtue in filings of steel, tho' the filings may rust with it, and likewise impair its virtue; but the violence of fire impairs it more in one hour, than the rust does in several days. Father Dechaies says, the loadstone does not attract red hot iron, the occasion of which is undoubtedly this, that the heat dissipates the magnetick spirits, by putting them in motion.

In fine; a loadstone also loses its virtue of attracting iron, when it is beat too violently upon the anvil; for that changes the disposition of its parts, and the figure of its pores. This reason is confirmed by the experience of Mr. Puget, who having put filings of steel into a glass tube, and placed a good loadstone near the filings in order to communicate its virtue, observed that these filings lost their magnetick virtue by being stirred and moved, so that they could not attract needles, as they had done before. To this purpose, it is said, that if a magneted steel needle changes its figure, that is, is turned from a streight to a bended, or from a bended to a streight figure, it quite loses its virtue.

F I N I S.





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